# 3.0

# FACILITY DESCRIPTION AND LOCATION

## 3.1 INTRODUCTION

SCPPA proposes to construct and operate a nominally rated 250 MW combined cycle electric generating unit on the property of the existing COB generating facilities.

The MPP will be constructed and operated to support the growing demand for electricity within the SCPPA service territory. The project will supply any additional available capacity and energy to California's restructured electric market.

COB generating facilities at the site have been operating since 1941. The proposed project includes demolition of the remaining components associated with Magnolia Units 1 and 2 (Figure 3.4-2), followed by the construction of a new combined cycle plant at the location of the demolished units. Station net power output will increase approximately 250 MW with the addition of the combined cycle plant, not including firing the HRSG or injecting steam into the CTG.

The new combined cycle unit will consist of one CTG, one HRSG, and one STG. Heat rejection for the STG will be accomplished with a new cooling tower that utilizes reclaimed water. Natural gas will be the only fuel utilized by the new CTG. Natural gas will be supplied to the combined cycle unit by the SoCalGas, the current supplier of natural gas to the existing facilities.

Electricity generated by the MPP will be delivered via the existing Olive Switchyard located on the COB power plant property and existing COB transmission system and the LADWP Receiving Station E.

Sanitary wastes will be directed to the existing interconnection with the municipal sanitary sewer operated by the COB Public Works Department. Plant process wastewater will be directed to the existing discharge point on the power plant property.

## 3.2 FACILITY LOCATION

The MPP is located in Burbank, California, a city in Los Angeles County (See Figure 3.2-1). The project will be constructed at an existing power plant operated by the COB. The MPP site is located at 164 Magnolia Boulevard, and is situated approximately 1/8 mile west of the I-5 freeway. The site is bordered by industrial properties on all sides.

The site is approximately 23 acres in size. The project will require approximately three of the 23 acres. Primary access to the site will be from either Olive Avenue or Magnolia Boulevard.

## 3.3 SITE DESCRIPTION

### 3.3.1 Topography

According to the Burbank, California Quadrangle, United States Geological Survey (USGS) 7.5-minute topographic map, the subject property is located at an elevation of approximately 560 feet above mean sea level (msl). The topography of the site vicinity is relatively flat, but slopes slightly to the south. A site topography plan is presented in Figure 3.3-1.

The MPP plant site is located in the southwest portion of the San Fernando Valley at the foot of the Verdugo Mountains on property owned by the COB. The project site is approximately 1.5 miles north of the Los Angeles River, and the Burbank Western Channel runs along the northeast property boundary.

The project site is relatively flat, with a slight slope running from the north to the south. The existing elevation of the site is approximately 560 feet.

The Los Angeles County Department of Public Works (LACDPW), in conjunction with the Army Corps of Engineers, has identified several areas within the Los Angeles River incapable of conveying the runoff from a 100-year flood. As such, flooding in Burbank would be limited to just outside the channel confines along the site's southernmost boundary line, which parallels the Los Angeles River. A study prepared for the COB has determined that the site is outside of the flood plain. Site grading contours will provide for control of both stormwater drainage and proper channeling of winter and spring runoff flows. (Refer to Subsections 3.5.7 "Site Grading and Drainage", and 3.5.9 "Earthwork" for more information concerning site preparation and drainage.)

### 3.3.2 Geological Setting and Seismology

The geology, seismic setting, and soil conditions at the site are discussed in detail in Section 5.3, and are summarized below.

The subject property is located in the southwest portion of the San Fernando Valley. The San Fernando Valley is a west–northwest trending interior coastal basin approximately 23 miles long and 12 miles wide. The San Fernando Valley is surrounded by the Simi Hills to the west, the Santa Monica Mountains to the south, the Santa Susana Mountains to the north and northwest, San Gabriel Mountains to the northeast, and the San Rafael Hills to the east. The San Fernando Valley is a down-faulted valley, which has been partially filled with alluvial sediments. The valley slopes gently to the south-southeast, towards the Los Angeles River. Sediments within the valley were deposited primarily along the major tributaries to the Los

Angeles River. A geotechnical investigation was conducted for the project area. The results of the investigation are included as Appendix G.

### 3.3.2.1 Subsurface Conditions

A subsurface exploration program was completed at the MPP site in February, 2001. A report of the investigation, which also included downhole seismic velocity measurements is presented as Appendix G.

The ground surface elevation at the MPP site is about 560 feet above msl and the ground surface descends uniformly down to the southeast at a grade of about 0.5 percent.

As discussed in Section 5.3, the MPP site is located within the eastern portion of the San Fernando Valley, which is situated between the Verdugo Mountains to the north and the Santa Monica Mountains to the south. The San Fernando Valley is underlain by thick deposits of unconsolidated sediments, which were deposited mostly in a marine environment upon granitic and metamorphic basement rock. The surficial sediments in the area of the MPP site were mapped by Dibblee (1991) as Holocene age (less than 11,000 years ago unconsolidated alluvial deposits consisting of clay, sand, and gravel).

### 3.3.2.2 Seismic Conditions

The site seismicity is discussed in detail in Section 5.3 of the AFC.

Several large active faults are located within the site region. Major Southern California faults with a potential for impacting the MPP include the San Andreas Fault, the Newport-Inglewood Fault, the Sierra Madre Fault, the San Fernando Fault, the Hollywood Fault and the Verdugo Fault. Strong seismic shaking has been experienced in the site vicinity due to previous earthquakes associated with several of those active faults. It is possible that the site will experience strong seismic shaking due to future earthquakes.

The San Andreas Fault Zone is approximately 27 miles from the COB, and is considered to be the major geological structural feature of Southern California. A southern-central portion of this fault is estimated to have an annual current probability of between two and 5 percent.

The Newport-Inglewood fault is considered the second most active fault zone in California, and is located about 12.5 miles southwest of the COB's Civic Center. This fault is capable of producing earthquakes in a 6.3 to 7.5 magnitude range.

The Sierra Madre fault extends along the base of the San Gabriel Mountains between Sunland and La Canada Flintridge. There is a 2.5 percent probability that an earthquake would occur on this fault within the next 100 years, but the principal hazard to the COB would be ground shaking, as opposed to liquefaction.

The San Fernando Fault is classified as an active fault with a 39 percent capability of generating a magnitude 6.5 earthquake within the next 100 years. The Hollywood Fault is estimated to be capable of generating a magnitude 6.4 earthquake at a probability of 6.2 percent within the next 100 years.

The Verdugo fault traverses Burbank through the Verdugo Mountains in the northeastern part of the city. The potential effects from an earthquake of a magnitude of 6.7 or greater would be damage to underground pipelines, landslides, and damage to the COB's downtown areas.

### 3.3.3 Hydrological Setting

The average annual rainfall, as measured in the project area, is 15.06 inches. The wettest month is January, with an average rainfall of 3.15 inches. July is the driest month, averaging 0.01 inch.

#### 3.3.3.1 Surface Water

Rainfall produces surface water runoff from the site and surrounding areas, which would be the most common source of floods. The site is located in the San Fernando Valley, which is a down-faulted valley partially filled with alluvial sediments. The valley slopes gently to the south-southeast toward the Los Angeles River. Burbank lies in the heart of the basin known as the Los Angeles County Drainage Area, from which storm waters are carried to the Pacific Ocean via the Los Angeles River and the San Gabriel River. As the San Fernando valley has developed over the years, an impervious asphalt/concrete cap over wide areas has greatly diminished the amount of rainwater that can be absorbed into the ground.

#### 3.3.3.2 Groundwater

The San Fernando Valley Groundwater Basin is the largest of four hydrologic basins within the Upper Los Angeles River Area. Groundwater recharge to the basin occurs from direct infiltration of precipitation, artificial recharge of imported water and treated wastewater effluent, and subsurface inflow from the adjacent groundwater basins. Depths to groundwater within the alluvial deposits of the basin range from approximately 50-300 feet below ground surface (bgs).

The soils underlying the subject property consist of sand, silt, silty sand, and silty clay. The depth to groundwater below the subject property is reported to be approximately 100 feet to 125 feet bgs and is reported to flow towards the south-southwest.

## 3.4 FACILITY DESCRIPTION

### 3.4.1 Overview

The proposed facility will consist of one 1-on-1, dual-shaft, combined cycle power island. The power island will include a natural gas fired, heavy-duty CTG nominally rated at 169 MW. The CTG will exhaust into a fired HRSG. Steam from the HRSG will be admitted into a condensing reheat STG with a nominal capacity of 85 MW without firing the HRSG, and 147 MW with full firing of the HRSG. The total net output of the power island, with CTG evaporative cooling, firing the HRSG and injecting steam into the CTG, will be approximately 328 MW (including the 12 MW resulting from steam injection)**.**

$NO_x$ emissions from the CTG will be controlled by dry low $NO_x$ combustors and a post combustion emission control system to meet or exceed current BACT/LAER limits for $NO_x$ and CO. The post-combustion emission control system will be a SCR system with proposed $NO_x$ and CO limits that will be at or below 2.5 ppmvd and 6.0 ppmvd, respectively, at 15 percent $O_2$. The proposed emission levels will meet the present BACT/LAER limits.

See Appendix C for the Mechanical Engineering Design Criteria and Appendix E for the Electrical Engineering Design Criteria.

### 3.4.2 Site Layout

A site grading and drainage plan is presented in Figure 3.4-1. The plant general arrangement is depicted on Figure 3.4-2 and a site elevation view of the new combined cycle plant is illustrated on Figure 3.4-3. These drawings show the location and size of the proposed combined cycle plant facilities.

The property is situated on approximately 23 acres of land. The new plant facilities will be constructed in an area of approximately 3 acres. The HRSG stack will have a height of 150 feet above grade to comply with air quality standards. Surrounding the plant facilities is a network of roads for fire equipment and facility maintenance access. The administration building expansion is located just west of the new power island. The demineralized water truck parking will be located south of the power island.

The plant facilities have been arranged to afford optimum use of the property as well as to ensure ease of operation. Investigations and evaluations have been conducted to define the specific facility equipment requirements and the suitability of the proposed project site to accommodate these facilities.

### 3.4.3 Power Island

#### 3.4.3.1 <u>Combustion Turbine Generator</u>

CTGs operate by converting thermal energy produced by combustion of natural gas into mechanical energy required to drive the CTG compressor and electric generator. Air for fuel combustion is supplied to the CTG through an inlet air filter, inlet air evaporative cooling system, and associated air inlet ductwork. Downstream of the inlet air filters and the air cooling section, the air is compressed in the compressor section of the CTG and then exits through the compressor discharge casing to the combustion chambers. Fuel is supplied to the combustion chambers where it is mixed with the compressed air, and the mixture combusts.

The high-temperature, pressurized gas produced by the combustion section expands through the turbine blades, driving the electric generator and the CTG compressor. Hot exhaust gas from the CTG is directed through internally insulated ductwork to the HRSG. Inside the HRSG, the exhaust gas is further heated with supplemental duct burners. Heat contained in the exhaust gas is absorbed by water and steam in the HRSG. The water is converted to steam and admitted to the STG for electric power generation.

The combined cycle CTG system will include the following:

- One CTG rated at 169 MW (nominal) at 95º F and 26.6 percent relative humidity with evaporative cooling.

- Dry low $NO_x$ combustors controlling CTG exhaust $NO_x$ emissions to 25 ppmvd at 15 percent $O_2$ upstream of the HRSG. The CTG auxiliary equipment will include the following:

  - Inlet air filter system
  - Inlet air evaporative cooling system
  - Closed cooling water system
  - Fuel gas system
  - Lubricating and hydraulic oil system
  - Duplex lube oil coolers
  - Compressor wash system (on-line and off-line capability)
  - Fire protection systems
  - Turbine and generator controls.

### 3.4.3.2 Heat Recovery Steam Generator

The HRSG transfers heat from CTG exhaust gases to feedwater flowing through finned tubes, to produce steam for the steam turbine operation. The HRSG is designed and constructed to operate at the maximum exhaust gas flow and temperature ranges of the CTG, plus supplemental duct firing heat input.

The HRSG will be a sliding-pressure fired, dual-pressure reheat type steam generator with horizontal gas flow complete with feedwater stop and check valves; steam stop valves; relief valves; continuous and intermittent blowdown valves; SCR post-combustion $NO_x$ and CO control system; and all necessary piping, valves, and instrumentation. The HP and LP sections each will consist of an economizer, evaporator, and superheater sections.

The HRSG will be complete with inlet and outlet ductwork, supplemental duct firing distribution grid, and a steel exhaust stack.

### 3.4.3.3 SCR Pollution Control System

Integral to the HRSG will be a SCR system with ammonia injection for the control of $NO_x$, CO, $SO_2$, and VOC emissions. The SCR system injects a 19 percent aqueous ammonia solution into the CTG exhaust gas stream that subsequently passes over a catalyst bed that reduces the oxides of nitrogen to inert nitrogen. The SCR equipment includes a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. Injection of ammonia would be approximately 300 pounds per hour (of 19.5% aqueous solution) when operating at baseload. For SCR, the ammonia injection is located upstream of the catalyst. Aqueous ammonia storage suitable for up to 11 days baseload operation at 24 hours per day would be provided. Storage consists of one 12,000 gallon tank. The ammonia unloading area will consist of a curbed concrete pad and containment vault.

An oxidizing catalyst system will also be installed in the HRSG to minimize emissions of CO.

### 3.4.3.4 Steam Turbine Generator

The STG system consists of a steam turbine, STG, gland steam system, lube oil system, and hydraulic control system. A 3,600 revolutions per minute (rpm), condensing-induction type reheat STG with side exhaust will be furnished. The STG will be designed for an output nominally rated at 147 MW with HP inlet throttle steam conditions of 1,904 pounds per square inch, absolute (psia) and 1,050º F.

#### 3.4.3.5 <u>Generators</u>

The generators will consist of a synchronous, 3,600 rpm, totally enclosed water/air-cooled (TEWAC) or hydrogen-cooled generator with class F insulation and all required accessories. Generating capability of the CTG will be approximately 200 Megavolt Amps (MVA) at a 0.85 power factor (pf). The power will be conveyed through the single shaft from the CTG. Generating capability of the STG will be approximately 180 MVA at a 0.85 pf. The power will be conveyed through the single shaft from the STG.

### 3.4.4 Heat Rejection System

Power cycle heat rejection will consist of a two-pass deaerating surface condenser, a circulating water system, a closed loop auxiliary water system and a conventional evaporative cooling tower array. The cooling tower will be designed with mist eliminators to minimize drift. The condenser air removal system will be by mechanical vacuum pumps or steam-jet air ejectors, depending on final design. The condenser and its auxiliaries will be designed to accept STG bypass flow during unit startup. The circulating water system will provide cooling water for condenser heat rejection as well as for auxiliary cooling water. The cooling water tower will be counter-flow, mechanical draft, and plastic fill design.

Dry, air cooled condensers were considered but they are much more expensive and cause a meaningful loss in plant efficiency. As long as the reclaimed water is available, the wet cooling tower is the best alternative.

### 3.4.5 Major Electrical Equipment and Systems

Most of the power produced by the generating facility will be transmitted to the grid through a new 69 kV underground circuit approximately 1,500 feet long (refer to information as presented on various figures in Section 3.6) for delivery to the participating members. The 69 kV circuits will be installed from the high voltage terminals of each generator transformer to the existing Olive Switchyard. However, some of the power produced will be used onsite to power auxiliaries such as pumps or control systems, and for general facility use including lighting, heating, and air conditioning. Some will also be converted from alternating current (AC) to direct current (DC) for use as backup power for the control systems and other uses. Each subsection generally describes provisions that will be incorporated into the system's design. Specific equipment and system ratings will be established during detail design. These uses are discussed in the following subsections.

#### 3.4.5.1 <u>AC Power Transmission</u>

An overall one-line diagram of the proposed facility electrical generation and distribution system is shown on Figure 3.4-4. The power will be generated by one power block consisting of one gas and one steam turbine generator 1x1 combined cycle unit at 18 kV and then stepped up by two generator step-up transformers to 69 kV for transmission. The output of each generator will be connected by isolated phase bus to a two-winding, oil-filled generator step-up transformer. Surge arresters at the high voltage bushings will protect the transformer from surges in the 69 kV system resulting from lightning strikes or other system disturbances. The transformers will be set on concrete pads with oil containment provisions provided. A deluge type fire protection system will be provided for each step-up transformer. Firewalls will be installed between transformers to protect each transformer from a fire from any adjacent transformers. The firewall will also offer a degree of protection to other equipment and structures in the immediate area. The high voltage primary side of each step-up transformer will terminate in the 69 kV switchyard using 69 kV underground circuit conductors, 69 kV high voltage circuit breakers, and associated disconnect switches.

#### 3.4.5.2 AC Power Distribution to Auxiliaries

Auxiliary power to the facility loads will be distributed at 4,160 volt AC by one auxiliary transformer and one double-ended 4,160 volt AC metal-clad switchgear/motor controller lineup. The auxiliary transformer will be responsible for supplying all electrical power to balance-of-plant (BOP) auxiliary equipment associated with both the gas and steam turbines within the 1x1 power block facility. Common facility loads such as the cooling tower and administration building will also receive power from the 4,160 volt switchgear. The auxiliary transformer will transfer power from the 34.5 kV substation to the plant auxiliary system. The 1x1 power block will have one oil-filled auxiliary transformer provided with 2-winding, 3-phase, 60 hertz, delta connected high side and wye connected resistance grounded low side winding. The secondary winding will supply auxiliary power to all 1x1 power block generation and BOP loads. The auxiliary transformer will be supplied with an off-load tap changer on the high voltage side. The high voltage side of the auxiliary transformer will be connected to the 34.5 kV Burbank switchyard by way of an underground 34.5 kV circuit. The auxiliary transformer will be connected, by way of non-segregated phase bus duct, to the 4,160 volt switchgear through a normally closed main switchgear breaker.

The AC power distribution system will be designed to enable a future off-site 4.16 kV power source to be connected to the 4,160 volt AC metal-clad switchgear/motor controller lineup. This connection will improve reliability of the AC power transmission system by providing an alternate source of startup power and backup to the auxiliary transformer.

The 4,160 volt switchgear lineup will supply power to the various 4,160 volt motors and to the secondary unit substation (SUS) transformers rated 4,160 to 480 volts for 480 volt power distribution. The switchgear will have vacuum operated metal-clad breakers for the main feeds and tie breaker. Fused contactors will be used for power distribution to secondary unit substations (SUS) and motors. The 4,160 volt system will be low resistance grounded to limit the maximum ground fault current.

The SUS transformers will either be an oil-filled outdoor type or an indoor dry type and will each supply 480 volt, 3-phase power to the SUS buses through normally closed SUS main breakers. Normally open tie breakers will be supplied to allow each SUS bus to be powered by one transformer if the second transformer is unavailable. In addition, a breaker will be provided on each SUS bus for connection to an offsite 480 volt power source if so required by the detailed design. The 480 volt system will be high resistance grounded to minimize the need for individual ground fault detection.

The SUSs will provide power through feeder breakers to the various large 480 volt motors and to motor control centers (MCCs). The MCCs will distribute power to smaller 480 volt motors, to 480 volt power panels, and other intermediate 480 volt loads. The MCCs will distribute power to 480-480/277 volt isolation transformers when 277 volt, single-phase lighting loads are to be served. The 480 volt power panels will distribute power to small 480 volt loads.

Power for the AC power supply (120/208 volt) system will be provided by the 480 volt MCCs and 480 volt power panels. Transformation of 480 volt power to 120/208 volt power will be provided by 480-120/208 volt dry-type transformers.

#### 3.4.5.3 DC Power Supply

The DC power supply system for BOP loads will consist of two 125 volt DC battery banks, two 125 volt DC full capacity battery chargers, metering, ground detectors, and distribution panels. One 125 volt DC battery bank will be dedicated to the essential service UPS system. The other 125 volt DC battery bank will feed all other station DC loads. Additional 125 volt DC systems may also be supplied as part of the CTG equipment.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480 volt, 3-phase AC power from the AC power supply (480 volt) system and continuously float charge the battery while supplying power to the DC loads. The ground detection scheme will detect grounds on the DC power supply system.

Under abnormal or emergency conditions when power from the AC power supply (480 volt) system is unavailable, the battery will supply DC power to the DC power supply system loads. Recharging of a discharged battery will occur whenever 480 volt power becomes available from the AC power supply (480 volt) system. The rate of charge will be dependent on the characteristics of the battery bank, battery charger, and the connected DC load during charging. However, the anticipated maximum recharge time will be 12 hours.

The BOP 125 volt DC system will be used to provide control power to the 4,160 volt switchgear, the 480 volt SUSs, and to critical control circuits.

### 3.4.5.4 Essential Service AC

The CTG will also have an essential service 120 volt ac, single-phase, 60 hertz power source to supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require uninterruptible AC power. Both the essential service AC system and the DC power supply system will be designed to ensure that all critical safety and unit protection control circuits always have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and voltage regulator, and AC panelboards.

The normal source of power to the system will be from the DC power supply system through the inverter to the panelboards. A solid-state static transfer switch will continuously monitor both the inverter output and the alternate AC source. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

### 3.4.5.5 Loss of AC Power

In the event of a total loss of auxiliary power, or in situations when the utility transmission system is out of service, the emergency power required to provide power to emergency lighting and critical process systems will be provided by batteries and an off-site emergency power source. Refer to Subsection 3.4.11.5 for a description of the emergency off-site power source. Emergency lighting will be supplied by the use of fixtures containing integral battery packs. The CTG and STG critical loads, such as turbine lube oil pumps and jacking gear motors, will be powered from the emergency offsite power source.

### 3.4.5.6 <u>Black Start Power Considerations</u>

Black start power can be obtained from the existing Magnolia Unit 5 CTG or the Unit 3/4 CTGs at the Olive Station.

Provisions are included for a future off-site connection to a 4.16 kV power source.

## 3.4.6 Fuel Gas System

Fuel for the facility will be natural gas delivered by the SoCalGas, a California public utility through the existing supply piping near the plant site. The natural gas pressure is between 230 and 420 pounds per square inch (psi) pressure. This is less than the 450 psi minimum pressure required for CTG operation. Two 100 percent capacity fuel gas compressors (one operating and one installed spare) will be provided to boost the natural gas pressure to the level required by the CTG. New gas metering station(s) and associated on-site piping will be located on the eastern side of the site. Much of the existing on site gas supply piping for Units 3 and 4 will be isolated and abandoned in place. Portions of the existing piping (above and below grade piping located on the east side of Magnolia Units 1, 2, 3 and 4) including the existing metering station, will be removed.

## 3.4.7 Water Supply and Treatment

Water will be supplied to the MPP via the COB potable water distribution system and the Burbank Water Reclamation Plant operated by the Public Works Department, and existing reclaimed water distribution piping. The reclaimed water will be used as a makeup water source to the facility’s evaporative cooling tower. Potable water from the city will be used at the facility during operations as cooling water, service water, and as supply to the cycle makeup treatment system. Water for use in the Fire Protection System will also be provided by the COB from the city water system.

The MPP is designed to maximize the use of reclaimed water for cooling. However, the amount of reclaimed water that can be used is constrained by limitations contained in the COB’s current discharge permit. The Participating Members of SCPPA are sensitive to the need to minimize use of potable water for purposes that can be met by reclaimed water and will work collaboratively with the COB and regulatory bodies to resolve issues which hinder or preclude use of more reclaimed water. As discussed in Section 3.4, compliance with existing discharge limitations would require, on average, 5,619,000 gallons per day (6900 acre-feet per year) of potable water with 941,000 gallons per day (1200 acre-fee per year) of reclaimed water. Should the COB discharge permit limits be raised, the Reclamation Plant can supply the total 6,560,000 gallons per day of reclaimed water needed for plant cooling, thus eliminating the need for the use of potable water for cooling.

In order to be conservative, the analysis in this AFC has assumed that the existing discharge permit limits remain in place. However, alternative water balances based on potential revised discharge permit limits are also discussed.

The potable water use for HRSG feedwater and service water is 393,000 gallons per day. The water supply for the COB comes from three different sources: these are local groundwater (59%), the Colorado River (3%), and the State Water Project (34%). Reclaimed water for irrigation makes up the remaining 4 percent of the COB supply.

### 3.4.7.1 Water Supply Requirements

The typical daily, maximum, and annual water uses for the MPP are shown in Tables 3.4-1 and 3.4-1A. Figure 3.4-5A shows the expected water balance and usage for an average day. Figure 3.4-5B shows the water balance and usage for a maximum condition. The water supply requirements include domestic uses, fire water, cycle makeup and miscellaneous plant uses, cooling tower makeup, and CTG inlet air evaporative cooler. Cooling tower duty includes auxiliary cooling loads.

**TABLE 3.4-1**

**DAILY WATER SUPPLY REQUIREMENTS**

| Water Supply | Average Usage[1] | Maximum Usage |
|---|---|---|
| **Reclaimed Water** | | |
| Cooling Tower Makeup | 941,000 gal/day[2] | 3,801,000 gal/day[2] |
| Total Reclaim Water | 941,000 gal/day | 3,801,000 gal/day |
| **Potable Water** | | |
| Cooling Tower Makeup | 5,619,000 gal/day[2] | 5,663,000 gal/day[2] |
| Cycle Makeup Treatment System | 380,000 gal/day | 380,000 gal/day |
| Plant and Equipment Drains | 11,000 gal/day | 11,000 gal/day |
| Chemical Drains/Flushing Water | 0 gal/day | 2,000 gal/day |
| Potable and Sanitary Uses | 2,000 gal/day | 2,000 gal/day |
| Total Potable Water | 5,999,000 gal/day | 6,014,000 gal/day |

[1] Daily use based on 95° F average annual ambient temperature and full load operation.
[2] Does not include wastewater streams recycled to tower as supplemental makeup. Refer to water mass balance (Figure 3.4-5) for amounts of wastewater to be recycled to the cooling tower.

**TABLE 3.4-1A**

**ANNUAL WATER CONSUMPTION**

| Water Supply | Average Annual Usage[1] | Maximum Usage[1] |
|---|---|---|
| Reclaimed Water | 1,200 acre-ft/year | 4,400 acre-ft/year |
| Potable Water | 6,900 acre-ft/year | 6,900 acre-ft/year |
| Discharge to Burbank Western Channel | 5,100 acre-ft/year | 8,300 acre-ft/year |

[1]Based on 95° F annual average temperature and full load operation.

### 3.4.7.2 <u>Water Quality and Balance</u>

The Burbank potable water and the reclaimed water supply have an average water quality as listed in Table 3.4-2. Water use is shown in the water balance diagram (Figure 3.4-5A).

### 3.4.7.3 <u>Water Pretreatment</u>

Reclaimed water, supplied to the facility for cooling tower makeup, will have the capability to be hypochlorinated prior to direct use as cooling tower makeup.

Potable water will be supplied through an interconnection with the COB's existing distribution system and will not require pretreatment. The city water will supply potable water uses, fire protection, cycle makeup, and supplemental cooling tower makeup as required.

**3.4.7.3.1 <u>Cooling Tower Makeup Water</u>.** There will be one cooling tower for the facility. The tower will provide heat rejection for the facility's steam turbine cycle.

The majority of the makeup water will be potable water and is expected to have a total dissolved solids content of approximately 600 milligrams per liter as fed to the cooling tower. Potable water will be available for use in the cooling tower as necessary to meet discharge limitations. The circulating water will be continuously treated and controlled in order to achieve not more than 1.5 cycles of concentration.

As discussed above, the COB discharge permit is being revised and the Applicant expects that the revised discharge limits will allow for higher cycles of concentrations and maximum use of reclaimed water as the source of cooling tower make-up. This alternative is discussed in more detail in Section 3.11.

## TABLE 3.4-2

## EXPECTED RECLAIMED AND POTABLE WATER QUALITY (mg/L, EXCEPT AS NOTED)

| Constituent | Design Reclaimed Water | Design City Water |
|---|---|---|
| Calcium | 57 | 61 |
| Magnesium | 18 | 15 |
| Sodium | 114 | 44 |
| Potassium | 15 | 3 |
| M-Alkalinity, as $CaCO_3$ | 247 | 184 |
| Chloride | 113 | 34 |
| Sulfate | 96 | 62 |
| Fluoride | <0.1 | <0.1 |
| Nitrate | 5 | 21 |
| Silica | 23 | 22 |
| TSS | NR[1] | -- |
| Turbidity | 1 | 0.4 (NTU) |
| TDS | 719 | 476 |
| $BOD_5$ | 8 | NR[1] |
| Ammonia | 5 | NR[1] |
| COD | NR[1] | NR[1] |
| Boron | 1 | NR[1] |
| Phosphate | 3 | <0.1 |
| pH, S.U. | 7.3 | 7.6 |
| Cyanide | <0.02 | NR[1] |
| Cadmium | <0.010 | NR[1] |
| Chromium | <0.010 | <0.010 |
| Copper | 0.001 | 0.007 |
| Lead | <0.050 | NR[1] |
| Mercury | <0.0002 | NR[1] |
| Nickel | <0.001 | NR[1] |
| Silver | <0.050 | NR[1] |
| Zinc | 0.001 | 0.21 |

[1] NR – Not reported.

**TABLE 3.4-3**

**COOLING TOWER OPERATING CHARACTERISTICS**

| Parameter | Cooling Tower[1] Average | Evaporative Coolers |
|---|---|---|
| Circulating Water, gpm | 103,000 | 1,650 |
| Number of Cells | 6 | -- |
| Makeup, gpm | 4,600 | 150 |
| Blowdown, gpm | 3,100 | 100 |
| Drift, gpm | 1 | -- |
| Evaporation plus Drift, gpm | 1,500 | 100 |

[1] All numbers are approximate and are for 95$^{o}$ F day conditions and full load operation.

**3.4.7.3.2 <u>Circulating Water Treatment</u>.** A circulating water chemical feed system will supply water conditioning chemicals to the circulating water system to minimize corrosion and to control biofouling. To prevent ground contamination, all circulating water chemicals will be stored in double contained storage tanks.

Sulfuric acid will be fed into the circulating water system for alkalinity reduction and pH adjustment in order to control the scaling tendency of the circulating water. The acid feed equipment will consist of a bulk sulfuric acid storage tank and two full-capacity, piston-diaphragm sulfuric acid metering pumps.

To minimize biofouling in the circulating water system, sodium hypochlorite will be shock fed into the system as a biocide. The hypochlorite feed equipment will consist of a bulk storage tank and two full-capacity, piston-diaphragm inhibitor metering pumps.

Residual chlorine in the blowdown water will be minimized by the design of the chlorination/dechlorination system and its operation. Proprietary biocide will be available onsite for direct feed into the circulating water system to control algae, if necessary. Dechlorination will be used to ensure that the Discharge 001 to the Burbank Western Channel is compliant with the regulations.

At 1.5 cycles of concentration, it is estimated that the circulating water will have a total dissolved solids content of approximately 750 milligrams per liter.

**3.4.7.3.3 Cycle Makeup Water Treatment.** Prior to use as makeup to the HRSG/ST steam cycle, additional treatment of city water by demineralization will be required. City water will be directed to the cycle makeup treatment system to produce high quality demineralized water for makeup to the steam cycle and for miscellaneous plant uses. This system will include a leased mobile demineralizer utilizing off-site regeneration facilities. Demineralized water produced will be directed to a demineralized water storage tank for storage and use.

**3.4.7.3.4 Cycle Chemical Feed System.** The cycle chemical feed system will supply water conditioning chemicals to the HRSG/ST steam cycle to minimize corrosion. The system will feed an oxygen scavenger and a neutralizing amine to the feedwater and condensate, respectively, for dissolved oxygen control and cycle pH control. The design will provide for automatic feed of oxygen scavenger and amine in proportion to feedwater and condensate flow rates, respectively. This method of treatment is referred to as all volatile treatment and is often employed for once-through design steam generators. The potential use of full-flow condensate polishing to assure satisfactory feedwater over a range of operating conditions will be evaluated during detail design. A condensate polishing system would include multiple service vessels containing cation/anion exchange resins, external resin separation and regeneration system vessels, acid and caustic regeneration equipment, chemical waste sump and pumps, and a programmable logic control (PLC) system. Condensate polishing system regeneration wastes would be directed to a neutralization tank for pH adjustment prior to disposal.

#### 3.4.7.4 Power Plant Discharge

The combined wastewater discharge from the plant will consist of cooling tower blowdown (refer to Tables 3.4-4 and 3.4-5). Figures 3.4-5A/B also illustrate the sanitary flow paths.

Relatively higher quality wastewater such as HRSG blowdown, plant drains without oil contamination, and CTG inlet air evaporative cooler blowdown, will be recycled and reused as supplemental makeup to the cooling tower.

### 3.4.8 Management and Disposal of Hazardous Materials and Hazardous Wastes

#### 3.4.8.1 Chemicals

A variety of chemicals will be stored and used during construction and operation of the facility. A list of chemicals anticipated to be used is provided in Table 3.4-6.

## TABLE 3.4-4

## PROCESS WASTE CHARACTERIZATION

| | Units | Cooling Tower Blowdown | Oil/ Water Separator Effluent | Uncontaminated Precipitation | Combined Wastewater | Current Discharge Limits |
|---|---|---|---|---|---|---|
| Flow, kgpd | | 4,353 | 11 | 25 | 4,378 | -- |
| Ca | Mg/l | 91 | 61 | 0 | 91 | -- |
| Mg | Mg/l | 23 | 14 | 0 | 23 | -- |
| Na | Mg/l | 80 | 44 | 0 | 79 | -- |
| K | Mg/l | 7 | 3 | 0 | 7 | -- |
| M. Alk as $CaCO_3$ | Mg/l | 248 | 215 | 10 | 247 | -- |
| C1 | Mg/l | 60 | 34 | 0 | 60 | 190 |
| $SO_4$ | Mg/l | 139 | 61 | 0 | 138 | 300 |
| $NO_3$ | Mg/l | 1 | 17 | 0 | 1 | -- |
| $C1_2$ | Mg/l | 0.2 | -- | 0 | 0.2 | 0.2 |
| $SiO_2$ | Mg/l | 33 | 21 | 0 | 33 | -- |
| TSS | Mg/l | 15 | 0 | 0 | 15 | 15 |
| TDS | Mg/l | 762 | 0 | 10 | 946 | 950 |
| Inhibitor | Mg/l | 42 | -- | 0 | 41 | -- |
| Fe | Mg/l | 0.068 | 0.051 | 0 | 0.067 | 0.300 |
| Cu | Mg/l | 0.009 | 0.007 | 0 | 0.009 | 0.011 |
| Al as $Al_2O_3$ | Mg/l | 0.066 | 0.050 | 0 | 0.066 | 1 |
| $PO_4$ | Mg/l | 0.17 | 0.10 | 0 | 0.17 | 5 |
| pH | S.U. | 6 to 9 | 8 | 6.5 | 6 to 9 | 6.5 to 9.0 |
| Conductivity | µS/cm | 950 | 600 | 10 | 946 | 958 |
| CTG BD below = 1.5* PWD Monthly Monitoring Report Value, Discharge 002, except < values are shown | | | | | | |
| Turbidity | NTU | -- | -- | -- | <3 | 2 |
| Temperature | $^oF$ | 65 to 82 | -- | -- | 100 | 100 |
| $BOD_5$ | Mg/l | 12 | -- | -- | 12 | 20 |
| O/G | Mg/l | <2 | -- | -- | <2 | 10 |
| Settlable Solids, SS | Mg/l | -- | -- | -- | -- | 0.1 |
| CN | Mg/l | <0.02 | -- | -- | <0.02 | 5.2 |
| S | Mg/l | -- | -- | -- | -- | -- |
| B | Mg/l | 1.5 | -- | -- | 1.5 | 1.5 |
| F | Mg/l | 0.8 | -- | -- | 0.7 | 2.0 |
| Det, MBAS | Mg/l | 0.3 | -- | -- | 0.3 | 0.5 |
| $NO_2$-N | Mg/l | 0.9 | -- | -- | 0.9 | 1 |
| $NO_2$-N+$NO_3$-N | Mg/l | 6 | -- | -- | 6 | 8 |
| $NH_3$ | Mg/l | 27 | -- | -- | 27 | 10 |
| Organic-N | Mg/l | <2.5 | -- | -- | <2.5 | -- |

# TABLE 3.4-4

# (CONTINUED)

| | Units | Cooling Tower Blowdown | Oil/ Water Separator Effluent | Uncontaminated Precipitation | Combined Wastewater | Current Discharge Limits |
|---|---|---|---|---|---|---|
| Ba | Mg/l | 0.108 | 0.081 | -- | 0.108 | 1.0 |
| Mn | Mg/l | 0.021 | 0.016 | -- | 0.021 | 0.050 |
| As | Mg/l | 0.003 | -- | -- | 0.003 | 0.050 |
| Cd | Mg/l | <0.010 | -- | -- | <0.010 | 0.001 |
| Cr | Mg/l | 0.013 | 0.010 | -- | 0.013 | 0.2 |
| Pb | Mg/l | <0.050 | -- | -- | <0.050 | 0.0025 |
| Hg | Mg/l | <0.0002 | -- | -- | <0.0002 | 0.000012 |
| Ni | Mg/l | 0.000 | 0.000 | -- | 0.000 | 0.001 |
| Se | Mg/l | <0.002 | -- | -- | <0.002 | 0.005 |
| Ag | Mg/l | <0.050 | -- | -- | <0.050 | 0.0034 |
| Zn | Mg/l | 0.277 | 0.208 | -- | 0.276 | 1 |
| Co | Mg/l | <0.050 | -- | -- | <0.050 | -- |
| PCB | Mg/l | <0.0002 | -- | -- | <0.0002 | None |
| Endrin | Mg/l | <0.000005 | -- | -- | <0.000005 | 0.0000023 |
| Lindane | Mg/l | <0.000005 | -- | -- | <0.000005 | 0.0001 |
| 1,4-dichlorobenzene | Mg/l | <0.003 | -- | -- | <0.003 | 0.005 |
| Bis (2-ethylhexyl)-phthalate | Mg/l | 0.086 | -- | -- | 0.085 | 0.004 |
| 1,2-dichloroethane | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.0005 |
| Chloroform | Mg/l | 0.007 | -- | -- | 0.007 | 0.100 |
| Ethylbenzene | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.700 |
| Toluene | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.150 |
| Tetrachloroethylene | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.005 |
| Methylene chloride | Mg/l | <0.003 | -- | -- | <0.003 | 0.005 |
| Bromoform | Mg/l | <0.001 | -- | -- | <0.001 | 0.100 |
| Bromodichlore-methane | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.100 |
| Dichlorobromo-methane | Mg/l | <0.0005 | -- | -- | <0.0005 | 0.100 |
| 2,4-D | Mg/l | <0.0004 | -- | -- | <0.0004 | 0.070 |
| 2,4,5-TP Silvex | Mg/l | <0.00002 | -- | -- | <0.00002 | 0.010 |
| Nitrobenzene | Mg/l | -- | -- | -- | -- | -- |
| 2,4-chlorophenol | Mg/l | -- | -- | -- | -- | -- |
| Phenol | Mg/l | 0.030 | -- | -- | 0.030 | -- |
| Methoxychlor | Mg/l | <0.000005 | -- | -- | <0.000005 | -- |

## TABLE 3.4-4

## (CONTINUED)

| | Units | Cooling Tower Blowdown | Oil/ Water Separator Effluent | Uncontaminated Precipitation | Combined Wastewater | Current Discharge Limits |
|---|---|---|---|---|---|---|
| MTBE | Mg/l | 0.0015 | -- | -- | 0.0015 | -- |
| DDT | Mg/l | <0.000005 | -- | -- | <0.000005 | -- |
| PAH | Mg/l | <0.004 | -- | -- | <0.004 | -- |
| Remaining Priority Pollutants | Mg/l | -- | -- | -- | PQL | None Detected |

## TABLE 3.4-5

## ESTIMATED LIQUID PROCESS WASTE VOLUMES TO DISCHARGE 001 AND TO LOCAL SEWER

| Waste Stream | Source | Typical Wash Volume[1] | Peak Flows |
|---|---|---|---|
| Cooling Tower Blowdown | Cooling tower reclaim water makeup, evaporative cooler blowdown, score regeneration water, boiler blowdown. | 4,375,000 gal/day | 3,050 gpm |
| Uncontaminated Precipitation Runoff[3] | Weather | 25,000 gal/day | 150 gpm |
| Total to Discharge 001 | | 4,480,000 gal/day | 3,100 gpm |
| Oil/Water Separator Effluent | Plant and equipment drains contaminated precipitation runoff | 11,000 gal/day | 100 gpm[2] |
| Sanitary Drains | Domestic wastes | 2,000 gal/day | 50 gpm |
| Total to Local Sewer | | 13,000 gal/day | 150 gpm |

1 All numbers are approximate and are based on 65° F annual average ambient temperature and full load operation.
2 Excluding precipitation runoff.
3 Only precipitation runoff from areas with potential oil contamination go to the oil/water separator.

## TABLE 3.4-6

## ANTICIPATED HAZARDOUS CHEMICAL USAGE AND STORAGE[1]

| Material | Purpose | Usage/Day[1] | Amount Stored[1] | Storage Type |
|---|---|---|---|---|
| Oxygen Scavenger Solution | Feedwater oxygen control | 6 lb | 300 gal | Portable vessel |
| Sodium hypochlorite NaOCl (as 12% solution) | Biocide for condenser cooling water system, water treatment | 109 gal | 7,500 | Tank, plastic |
| Hydrochloric acid HCl | Chemical cleaning of HRSG | As needed | Temporary only | Portable vessel |
| Ammonium bifluoride $NH_4HF_2$ | Chemical cleaning of HRSG | As needed | Temporary only | Portable vessel |
| Citric acid | Chemical cleaning of HRSG, feedwater systems | As needed | Temporary only | Portable vessel |
| EDTA chelant | Chemical cleaning of HRSG, feedwater systems | As needed | Temporary only | Portable vessel |
| Sodium nitrite $NaNO_2$ | Chemical cleaning of HRSG | As needed | Temporary only | Portable vessel |
| No. 2 diesel fuel oil | Emergency generator | As needed | 2,000 gal | Tank, UL C.S. |
| Sulfuric acid for station batteries | Electrical/control building combustion turbine miscellaneous | As needed | 0 | Battery |
| Mercury | Instruments and controls | As needed | 0 | Bottle |
| Betz PL 1200 P | Oxygen scavenger | 5 gal | 275 gal | Drums |
| Betz Steamate NA 0160 | Organic amine type corrosion inhibitor for steam | As needed | 0 | Portable vessel |
| Betz NA 0240 | Organic amine type corrosion inhibitor for steam | 2 gal | 250 gal | Portable vessel |
| Sodium Hydroxide | Spill neutralization | As needed | 2 gal | Carboy |

**TABLE 3.4-6**

**(CONTINUED)**

| Material | Purpose | Usage/Day[1] | Amount Stored[1] | Storage Type |
|---|---|---|---|---|
| Betz Optisperse | Boiler feedwater pH adjustment | As needed | 110 gal | Drums |
| Betz Spectrus OX1201 | Cooling tower biocide, oxidizing type | 2 gal | 400 gal | Portable vessel |
| Betz Foamtrol 4440 | Cooling tower antifoam | 2 gal | 110 gal | Portable vessel |
| Betz AZ8104 | Cooling water copper inhibitor | 25 gal | 275 gal | Portable vessel |
| Betz Dianodic DN 2301, nonhazardous as defined by OSHA regulations | Cooling water scale and deposit control | 10 gal | 600 gal | Portable vessel |
| Betz 3200 | Recirculated cooling water molybdate type corrosion inhibitor | 40 gal | 10 gal | Carboy |
| Sodium metabisulfite | Dechlorination of Discharge 001 | 300 gal | 4500 gal | FRP Tank |

[1]All numbers are approximate.

#### 3.4.8.2 Hazardous Wastes

Small quantities of hazardous wastes will possibly be generated during construction. These may include waste paint, spent solvents, and spent welding materials. All hazardous wastes generated during facility construction and operation will be handled and disposed in accordance with applicable LORS and with the site CAD 980360796 permit conditions. Currently, the site is classified as a Large Generator and has a contract for disposal of hazardous wastes with a certified disposal contractor. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. Managed and disposed of properly, these wastes will not cause significant environmental or health and safety impacts.

Some hazardous wastes generated will be recycled. These include waste oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Waste oil and used oil filters will be recycled. Oil contaminated materials requiring disposal will be disposed of in a Class I waste disposal facility.

Other occasional waste streams may include alkaline or acid cleaning solutions used during preoperational chemical cleaning of the boiler and preboiler systems of the HRSG, acid cleaning solutions from chemical cleaning of the HRSG after the unit is put into service, and CTG wash and HRSG gas side wash waters. Waste generated during each cleaning operation will be temporarily stored onsite in portable tanks and disposed of offsite by the chemical cleaning contractor at an appropriate disposal facility.

### 3.4.9 Emission Controls and Monitoring Equipment

This section describes the emissions controls and continuous emission monitoring (CEM) equipment. The combustion and post combustion emission control technologies presented below will optimize emissions reductions consistent with normal operational practices. The MPP will utilize dry low-$NO_x$ (DLN) combustion combined with catalyst technology to control nitrogen oxide and carbon monoxide emissions. Combustion design with clean fuels shall be used to minimize emissions of other pollutants.

#### 3.4.9.1 $NO_x$ Emissions

A dry, low $NO_x$ combustor system will be provided to control the $NO_x$ concentration in the CTG exhaust gas. This combustion emission control technology reduces peak flame temperature for natural gas fired units by staging combustors and premixing fuel with air prior to combustion in the primary zone. Typically, this occurs in four distinct modes: primary, lean-lean, secondary, and premix. In the primary mode, fuel is supplied only to the primary nozzles to ignite, accelerate, and operate the unit over a range of low- to mid-loads and up to a set combustion reference temperature. Once the first combustion reference temperature is reached, operation in the lean-lean mode begins when fuel is also introduced to the secondary nozzles to achieve the second combustion reference temperature. After the second combustion reference temperature is reached, operation in the secondary mode begins by shutting off fuel to the primary nozzle and extinguishing the flame in the primary zone. Finally, in the premix mode, fuel is reintroduced to the primary zone for premixing fuel and air. Although fuel is supplied to both the primary and secondary nozzles in the premix mode, there is only flame in the secondary stage. The premix mode of operation occurs at loads between 50 and 100 percent of base load and provides the lowest $NO_x$ emissions. Due to the intricate air and fuel staging necessary for dry low-$NO_x$ combustor technology, the gas turbine control system becomes a very important component of the overall system.

An SCR in the HRSG will provide further reduction of $NO_x$. This is an add-on control technology in which ammonia will be injected into the exhaust gas stream in the presence of a catalyst bed to combine with $NO_x$ in a reduction reaction forming nitrogen and water. For this reaction to proceed satisfactorily, the exhaust gas temperature must be maintained between 450°F and 850°F. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. The reactor chamber would be located in an appropriate zone of the HRSG where the catalyst will be the most effective at all loads. The ammonia injection is located upstream of the catalyst. SCR is a commercially available, demonstrated control technology currently employed on several combined cycle combustion turbine projects capable of very low $NO_x$ emissions (< 2.5 ppmvd) with control efficiencies up to 98 percent.

### 3.4.9.2 <u>CO and VOC Emissions</u>

Combustor designs lower CO emissions concurrently with $NO_x$ emissions.

To further reduce CO emissions, an oxidation catalyst will be used. An oxidation catalyst consists of a noble metal catalyst section incorporated into the combustion turbine exhaust. The catalyst promotes oxidation of CO to $CO_2$ at much lower temperatures (650°F to 1,150°F) than possible for oxidation without the catalyst. The control efficiency is primarily a function of gas residence time and can exceed 90 percent. For this project, the exhaust gas temperature of approximately 850°F is in the proper design range for the selected catalyst.

Volatile organic compounds (VOCs) include all unburned hydrocarbons except methane. VOC emissions are low due to proper combustion controls in the combustion turbine. No other controls are required for VOC control.

#### 3.4.9.3 Particulates

Particulate emissions are minimized through the use of natural gas. In addition, inlet air filtration is used to minimize airborne particulate ingestion into the combustion turbine. Particulate emission from combustion of natural gas is minimal as compared to other types of fossil fuels.

#### 3.4.9.4 Emission Monitoring

The project will install a CEM system, which will sample, analyze, and record the concentration of carbon monoxide, oxides of nitrogen, and oxygen/carbon dioxide in the flue gas. The system generates a log of emissions data and provides alarm signals to the control room when the level of emissions exceeds pre-selected limits. Continuous compliance with the $NO_x$ emission limits will be demonstrated with the CEM system based on the applicable averaging time designated.

### 3.4.10 Fire Protection

The fire protection system will mitigate personnel injury, loss of life, property loss, and plant downtime due to fire. The existing COB fire water system will provide an adequate quantity of firefighting water to yard hydrants, hose stations, and water spray and sprinkler systems. The fire water distribution system will have sectionalizing valves so that a failure in any part of the system can be isolated while allowing the remainder of the system to function properly. Fire hydrants with hose houses will be spaced at approximately 300 foot intervals around the facilities. The hydrants will be located and the hose houses equipped in accordance with NFPA 24 and local fire codes.

Fixed fire protection systems will be provided for the STG bearings and lube oil equipment, cooling towers, and station oil-filled generator step-up transformers. The cooling tower fire protection system will be designed and installed in accordance with NFPA 214. Sprinkler and fixed spray systems will be designed and installed in accordance with NFPA 13 and NFPA 15.

In addition to the fixed fire protection systems, portable $CO_2$ and dry chemical extinguishers will be located throughout the plant (including the switchgear rooms) with size, rating, and spacing in accordance with NFPA 10. Handcart $CO_2$ extinguishers will also be provided in the CTG area as necessary for specific hazards.

Local building fire alarms will be provided in accordance with NFPA 72 as required by this building code. All material used in construction of the plant and its auxiliary systems will be free of asbestos and will meet the fire and smoke rating requirements of NFPA 255.

### 3.4.11 Plant Auxiliaries

The following systems are used to support, protect, and control the generating facilities.

#### 3.4.11.1 Lighting

Lighting will be provided in the following areas:

- Building interior, office, control, and maintenance areas
- Building exterior entrances
- Outdoor equipment platforms and walkways
- Transformer areas
- Plant roads
- Parking areas
- Entrance gate
- Cooling tower.

Lighting at the proposed project site will be maintained at levels necessary to meet security, operation and maintenance, and safety requirements. Security lighting will also add to the project's overall visibility.

Emergency lighting from DC fixtures with integral battery packs will be provided in areas of normal personnel traffic to permit egress from the area in the event of failure of the normal lighting system. In major control equipment areas and electrical distribution equipment areas, emergency lighting will permit equipment operation for reestablishing auxiliary power.

#### 3.4.11.2 Grounding and Lightning Protection

The electrical system will be susceptible to ground faults, lightning, and switching surges, which result in unit ground potential rises. This will constitute a hazard to site personnel and electrical equipment. A grounding system will provide an adequate path to permit the dissipation of ground fault currents and minimize the ground potential rise.

The station-grounding grid will be designed with adequate capacity to dissipate heat from ground current under the most severe fault conditions in areas of high ground fault current concentration. The grid spacing will be such that safe voltage gradients are maintained.

Bare conductors will be installed below grade in a grid pattern. Each junction of the grid will be bonded together by either an exothermal welding process or mechanical connectors.

Ground resistivity readings, performed as part of the subsurface investigations, will be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under fault conditions.

Grounding cables will be brought from the ground grid to connect to building steel and nonenergized metallic parts of electrical equipment. Insulated grounding conductors to the ground grid will be provided for sensitive control systems.

Lightning protection will be furnished for buildings and structures in accordance with NFPA 780 or UL 96 and UL 96A. Lightning protection requirements unique to the switchyard will be addressed as part of the transmission system.

#### 3.4.11.3 Cathodic Protection

There will be a cathodic protection system for buried carbon steel pipes and structures (except rebar), taking into account influences associated with any existing cathodic protection system to which the facility is adjacent and connected. Cathodic protection will be provided by an impressed current system, a sacrificial system, or a combination of both.

#### 3.4.11.4 Distributed Control System

A distributed control system (DCS) will provide modulating control, digital control, and monitoring and indicating functions for operation of the plant power island systems. The DCS is described in detail in Appendix D of this AFC.

Plant operation will be controlled from cathode ray tube (CRT) based operator work stations, and the auxiliary control panels that are located in the control room.

The DCS will provide coordinated control among the CTG, STG, HRSG, and BOP equipment. The CTG and STG control systems will interface with the DCS via a data link and/or hard-wired input/output (I/O). Limited monitoring and control will be available from the DCS for the CTGs and STGs. The HRSG and power cycle related BOP equipment will be monitored and controlled via the DCS.

The DCS will provide monitoring and alarming of pollutant concentrations in the exhaust gas stream from the CEM system via hard-wired inputs. A sequence-of-events (SOE) function will be an integral part of the DCS.

Annunciation will primarily be done in the DCS. Major packaged subsystems (i.e., water treatment system, etc.) may have a local alarm system with a single trouble alarm to the control room.

#### 3.4.11.5 <u>Emergency Off-site Power Source</u>

Supplementary to the DC battery system, the emergency off-site power source will provide long-term power for a safe and orderly shutdown of each generating unit following the loss of AC auxiliary power and to provide for long-term essential loads. Details for exact location and interconnection with this source will be determined during detail design.

### 3.4.12 Heating, Ventilating, and Air Conditioning

The heating, ventilating, and air conditioning (HVAC) system will provide an acceptable environment for personnel comfort and equipment operation within the plant buildings.

The HVAC system will be designed in accordance with the Uniform Building Code (UBC) and the Uniform Mechanical Code (UMC) as prescribed by the California Code of Regulations.

Air conditioning in the control room and administrative areas will maintain a suitable environment for plant personnel. If required for proper equipment operation, humidity control will be provided in the control room.

Outside air ventilation systems will be provided for buildings where air conditioning is not required. Electric heaters will be used for winter heating,

Normally occupied plant areas, including toilet areas, will be supplied with fresh air in accordance with the UBC; American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 62; and the California Code of Regulations.

### 3.4.13 Plumbing

The plumbing system will supply potable water to all fixtures and will collect and convey waste fluids to the waste collection system.

## 3.5 CIVIL/STRUCTURAL FEATURES

This section describes the buildings, structures, and other civil/structural features that will constitute the facility as shown on Figure 3.4-2 (Site Arrangement Plan) and on Figure 3.4-1 (Site Grading and Drainage Plan).

### 3.5.1 Power Block

The power island complex will have two separate power island areas. The CTG area consists of one CTG, one HRSG, one stack, one generator, one generator step-up transformer, and one auxiliary transformer. The STG area consists of one STG, one condenser, one generator, one auxiliary transformer and one generator step-up transformer. The power island complex will also contain the BOP mechanical and electrical equipment.

The STG will be enclosed in a building and the CTG and HRSG will be located outside. The CTG and HRSG will be supported on reinforced concrete foundations at grade, with pile-supports as necessary. The STG and cooling tower will be supported on reinforced concrete pedestals mounted on a base mat at grade. The condenser will be supported in a similar fashion. Individual reinforced pads at grade will be used to support the balance of plant mechanical and electrical equipment.

### 3.5.2 Stacks

The HRSG will be provided with a self-supporting steel stack. The stack will be 150 feet tall and will include the associated appurtenances, such as sampling ports, exterior ladders, side step platforms, a lighting system, if required by FAA regulations, and electrical grounding.

### 3.5.3 Buildings

The plant buildings will include an administration building and an STG building.

The new administration building will be an expansion of the existing distribution center located adjacent to Unit 1. The expansion will be a two or three story building to match the existing structure and will house administrative areas and the control room for the new facilities. The building columns will be supported on mat foundations or individual spread footings.

The STG building will house the steam turbine generator and most of the BOP equipment for the STG. The building height will be approximately 70 feet. The building columns will be supported on mat foundations or individual spread footings.

### 3.5.4 Yard Tanks

The yard water storage tanks will include the demineralized water storage tank and additional tanks for the storage of chemicals are discussed in Section 3.4.8.

The yard storage tanks will be vertical, cylindrical, field-erected or shop fabricated steel tanks. Each tank will be supported on a suitable foundation consisting of either a reinforced concrete ring wall with an interior bearing layer of compacted sand for the tank bottom, or a reinforced concrete mat.

### 3.5.5 Roads

The new facilities will be served by the road network shown on Figure 3.4-2 (Site Arrangement Plan). The existing asphalt paved entrance road off of Lake Street will be used for access to the new power block and administration building expansion areas. All additional parking areas and miscellaneous access drives will also be asphalt paved.

### 3.5.6 Fencing

The existing facility currently utilizes masonry walls along adjacent public streets with controlled access gates located at the entrances to the property. Chain link security fencing surrounds the perimeter of the substation and other areas requiring controlled access. The existing controlled access gate located at the entrance off of Olive Avenue will be used for access to the new unit.

### 3.5.7 Site Drainage

The plant site is fully developed and paved. Storm runoff from this area is currently collected through a system of drop inlets and storm drain pipes to a storm drain line which discharges to the Burbank Western Channel.

Site drainage within the new power block area will be similar to the existing system. Storm runoff will be collected and routed to the storm drain and then to the Burbank Western Channel. Figure 3.4-1 (Site Grading and Drainage Plan) shows the proposed drainage system and conceptual grading plan. Storm water flows from areas with potential for oil contamination will be directed to an oil/water separator before being discharged to the sanitary sewer system.

### 3.5.8 Sanitary Sewer System

The sanitary sewer system will connect the new facilities to the existing COB sanitary sewer that currently runs north/south through the site. The sewage will be treated in the existing COB reclaim treatment plant.

### 3.5.9 Earthwork

Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, boulders, and debris to the lines and grades necessary for construction. Materials suitable for backfill will be stored in stockpiles at designated locations using proper erosion protection methods. Excess material will be removed from the site and disposed of at an acceptable location. If contaminated material is encountered during excavation, its disposal will comply with applicable federal, state, and local regulations.

The site is currently fully developed and generally flat. Figure 3.3-1 (Site – Existing Topography Plan) shows existing topographic information for the areas around the site and surrounding areas. No significant grade changes are anticipated for the final grading of the site.

Graded areas will be smooth, compacted, free from irregular surface changes, and sloped to drain. Cut and fill slopes for permanent embankments will be designed to withstand horizontal ground accelerations for Seismic Zone 4. For slopes requiring soil reinforcement to resist seismic loading, geogrid reinforcement will be used for fills and soil nailing for cuts. Slopes for embankments will be no steeper than 2:1 (horizontal:vertical). Construction will be at the existing plant grade, which is fairly level; therefore major cuts and fills are not anticipated.

Areas to be backfilled will be prepared by removing unsuitable material and rocks. The bottom of an excavation will be examined for loose or soft areas. Such areas will be excavated fully and backfilled with compacted fill.

Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve the specified density. To verify compaction, representative field density and moisture-content tests will be performed during compaction. Structural fill supporting foundations, roads, parking areas, etc., will be compacted to at least 95 percent of the maximum dry density as determined by American Society for Testing Materials (ASTM) D698. Embankments, dikes, bedding for buried piping, and backfill surrounding structures will be compacted to a minimum of 90 percent of the maximum dry density. General backfill placed in remote and/or unsurfaced areas will be compacted to at least 85 percent of the maximum dry density.

Where fills are to be placed on subgrades sloped at 6:1 (horizontal:vertical) or greater, keys into the existing subgrade may be provided to help withstand horizontal seismic ground accelerations.

The subgrades (original ground), subbases, and base courses of roads will be prepared and compacted in accordance with California Department of Transportation (Caltrans) standards. Testing will be in accordance with ASTM and Caltrans standards.

## 3.6 TRANSMISSION INTERCONNECTION FACILITIES

The new generation will be interconnected into the LADWP transmission grid through the existing COB Olive 69 kV switchyard and existing 69 kV transmission lines to LADWP's Receiving Station E. The Olive Switchyard is also located within the COB MPP complex in the southwest corner of the site. To accommodate the new generation, the new combustion turbine and the steam turbine will be connected to the Olive Switchyard with two 69 kV transmission lines. The switchyard will be expanded to the east with three new bays, two for the new generation and one for measuring.

The entire power complex site measures approximately 23 acres and is bounded by Magnolia Boulevard to the north, the Burbank Western Channel to the east, Olive Avenue to the south, and Lake Street to the west. The power generating complex contains six operating generation units (Magnolia Units 4 and 5, and Olive Units 1, 2, 3, and 4) and three abandoned or nonoperating units (Magnolia Units 1, 2, and 3), along with associated switchgear and substations, cooling towers, fuel storage, and maintenance facilities.

SCPPA is proposing to dismantle and remove the remaining infrastructure of Magnolia Units 1 and 2 and use this space for the new combined cycle combustion turbine generation facility. This new generation will be located in the northeast corner of the power generated complex (Figure 3.4-2). As part of the demolition, underground and aboveground fuel storage facilities will be removed, along with unused cooling towers associated with inactive or abandoned generating units.

### 3.6.1 Electrical Interconnection Point

The electrical interconnection facilities will connect the two individual generator step-up unit transformers (GSUs) at the combustion turbine and the steam turbine to the existing Olive Switchyard. The GSUs will be connected to the switchyard by two 69 kV transmission lines. These lines will be located entirely within the MPP complex and will be placed underground for their entire length. Existing off-site 69 kV transmission lines will then move the power from the Olive Switchyard through the COB and the LADWP transmission grid to member municipal utilities.

The project will not require the upgrade of any existing transmission lines or substations beyond the existing project site and the Olive Switchyard. All construction and operation of electrical interconnection facilities associated with the MPP will occur on COB property.

### 3.6.2 Transmission Line Specifications

The onsite interconnection facilities will consist of the underground transmission lines and the existing COB Olive 69 kV Switchyard. The two transmission lines will be placed underground and be located totally within COB property. The existing switchyard, a double bus single breaker facility, will be expanded to the east to accommodate the new generation and associated transmission lines. This switchyard expansion will require the relocation of natural gas metering station.

### 3.6.2.1 Conductor

Two 69 kV transmission circuits will be used to provide the underground connection between the two GSUs, located at the combustion and steam turbines, and the existing COB 69 kV switchyard. A double circuit 69 kV transmission line will connect the combustion turbine GSU to the switchyard, while another double circuit 69 kV transmission line will be installed between the steam turbine GSU and the switchyard. This preliminary design is based on the projected CTG output of 180 MW and the projected STG output of 150 MW, and anticipated poor soil conditions relative to thermal resistivity and heat dissipation. The lines will extend from the GSUs underground to termination riser structures within the expanded switchyard. The lines will be routed through the power generation complex to avoid existing structures and underground utilities, including a 36-inch storm drain that passes through the power complex site in a north-south direction. Approximate lengths of the two 69 kV transmission lines are as follows:

- CTG GSU to Switchyard-1,380 feet
- STG GSU to Switchyard-1,240 feet.

**3.6.2.1.1 Underground Cable Circuit Design.** The transmission lines from the two GSUs to the new bays in the Olive Switchyard will use ethylene propylene rubber (EPR) insulated single conductor cables. The 69 kV cables will be manufactured in accordance with the requirements of the applicable Insulated Cable Engineers Association (ICEA) and Association of Edison Illuminating Companies (AEIC) specifications. The cables will be installed in concrete encased duct banks utilizing six-inch polyvinyl chloride (PVC) conduits.

Normal ampacity calculations will be prepared during conceptual design and will be based on the soil substructure, thermal resistivity readings of the soil along the final route, centerline routing, and operational design criteria. It is anticipated that emergency ampacity calculations will not be required, as each circuit is connected to one GSU and no interconnections exist between the circuits or between the GSUs and the switchyard. Normal ampacity calculations will be performed during conceptual engineering to establish conductor size and type and number of cables required per phase for each underground transmission circuit. Initial estimates indicate that, to carry the projected electrical load from the two turbines, solid dielectric insulated cables, with a minimum of 1,500 kcmil copper (or equivalent) conductor, will be required for the transmission line portion of the project.

**3.6.2.1.2 Duct Bank Design.** As previously stated, the underground 69 kV transmission lines will be installed in concrete encased duct banks using six-inch PVC conduit. Depending on final engineering for the line, and final thermal resistivity calculations along the route, two duct banks may be required for the two transmission lines to dissipate heat from the conductors.

The size of the duct bank will be dependent on final engineering for the lines, but typically will have four six-inch PVC conduits aligned horizontally with a three-inch separation between each conduit. Three single solid dielectric conductors will be pulled through three conduits, with the fourth conduit being left as a spare. At a minimum, the duct bank could be approximately 40 inches wide. Depth of the duct bank will be dependent on how many circuits can be accommodated by the duct bank and the surrounding soil relative to heat dissipation. Typically, the concrete encased duct bank will be located approximately 48 inches below grade. Additional smaller conduit may be added to the duct bank for fiber optic cable communications.

Given the length of the two transmission lines and the circuitous route through the MPP complex to connect the GSUs to the Olive Switchyard, it is anticipated that some manhole construction will be required to accommodate pulling and/or splicing the cables. Preliminary engineering indicates that at least two manholes will be required to accommodate the proposed 69 kV transmission interconnection. They will be located along the final route of the two transmission lines within the MPP complex. To provide for safe and adequate space for cable pulling and/or splicing, each manhole will measure 20 feet in length, 10 feet in width, and eight feet in depth.

**3.6.2.1.3 Cable Accessories.** Cable accessories will be required at both the GSUs and in the expanded switchyard. Depending on final design, the new GSU transformers could be purchased with throat connectors to accommodate underground 69 kV cable terminations, thereby eliminating the need for overhead-to-underground transition structures at the GSUs. Riser structures will be required where the two transmission lines are connected to the switchyard facilities. Depending on the operating practices of COB and SCPPA, cable accessories could also include the installation of standard outdoor porcelain or polymer station class lightning arresters.

### 3.6.2.2 Transmission Route Description

From the CTG and STG GSU transformers, the two 69 kV transmission lines will be immediately routed underground to the south for a distance of approximately 170 feet (CTG) and 30 feet (STG). At a point behind Magnolia Units 3 and 4, the route turns east for approximately 240 feet to avoid Magnolia Unit 5 and existing equipment, a cooling tower associated with Magnolia Unit 4, and a possible second CTG. The route then turns south again, passing through existing storage yards and an unused fuel storage tank that is scheduled for removal. It extends south for some 650 feet through an existing equipment parking area to a point between an equipment garage and the cooling towers for Olive Units 1 and 2. At this point, the route turns west for some 320 feet between the garage and cooling towers and enters the proposed addition to the Olive 69 kV Switchyard.

The route measures approximately 1,380 feet from the CTG GSU and 1,240 feet from the STG GSU. The entire transmission line route will be located underground and within the COB MPP complex site, with most of the route planned to be beneath existing and planned site roads. No portion of the transmission line will require routing off of COB property. No new rights-of-way will be required offsite, nor will any other private property be required to accommodate the new transmission line or the substation expansion. The circuitous routing within the site is required to avoid existing generating units and associated aboveground and underground facilities.

### 3.6.3 Transmission Structures

As the proposed 69 kV transmission lines will be built completely underground, no transmission structures will be required for the project other than the transition structures at the GSUs and the termination/riser structures in the expanded switchyard. Termination structures will be approximately 11 feet in height and will be situated behind the 12-foot architectural wall along Olive Avenue. If GSU transformers with throat connectors are acquired for the generation project, then only termination/riser structures in the switchyard will be required for the two transmission lines.

#### 3.6.3.1 Structure Types

The only structures to be used for the proposed transmission lines will be the termination/riser structures. These will consist of T-structures made of steel approximately 8.5 feet high to support the cable and conduit as it enters and exits its underground duct bank, with insulators that will extend another 2.5 feet for the interconnection to the switchyard bus. Two riser structures will be used to connect the two transmission lines to the expanded switchyard.

#### 3.6.3.2 Special Structures

As the proposed 69 kV transmission lines will be installed completely underground, no special overhead structures will be required for the two transmission lines.

#### 3.6.3.3 Foundations

Foundations will be required for the termination/riser structures at the GSUs (if necessary) and within the switchyard. These will likely be drilled pier concrete foundations with the necessary anchor bolts.

#### 3.6.3.4 Use of Structures on Transmission Route

Between the proposed location for the new combustion turbine generation facility and the Olive Switchyard, there are no existing overhead structures that could be used by the proposed 69 kV transmission lines. Likewise, there is no underground conduit available to accommodate the two transmission lines.

#### 3.6.3.5 Structure Locations

The only aboveground structures associated with the two 69 kV transmission lines will be within the Olive Switchyard and possibly at the CTG GSU and the STG GSU. Their exact final locations will be determined as part of final plant and switchyard engineering.

#### 3.6.3.6 Access to Structures

The entire interconnection phase of the project will be located within the confines of the COB MPP complex in Burbank. COB will have controlled access to the overhead transition structures at the GSUs and in the Olive Switchyard, and to the 69 kV transmission lines (duct bank and manholes). No access to the electrical interconnection facilities will be required across any private property. The public will not have access to any portions of the underground transmission lines or the switchyard.

#### 3.6.3.7 Right-of-Way Requirements

The electrical interconnection for the project will not require the acquisition of right-of-way outside the MPP complex site. The proposed 69 kV transmission lines from the new combustion turbine generation facility to the expanded Olive Switchyard will be constructed entirely on COB property.

### 3.6.4 Transmission System Evaluation

At the present time it is envisioned that the output of the MPP will be utilized to serve portions of the electrical load in the Cities of Anaheim, Burbank, Colton, Glendale, and Pasadena. Glendale's share of the Project capacity could be delivered:

1. To the interconnection point between Burbank and the Los Angeles Department of Water (LADWP) at the Toluca Substation, and then over LADWP 230-kV faculties to the LADWP/Glendale interconnection at the Airway Substation, or

2. Via two 69-kV lines between the Burbank and Glendale systems.

The capacity shares of the other Participating Members would be delivered to the Burbank/LADWP interconnection point at Toluca, and from Toluca to the LADWP/Edison interconnection points. From the LADWP/Edison points it will then go to the Edison/Participating Members interconnection points over facilities owned by Edison, and under the operational control of the California ISO.

To meet the permitting requirements of the CEC, SCPPA retained a technical consultant to accomplish the following:

- Develop a detailed study plan for the transmission system studies to be undertaken and obtain comments on the study plan from SCPPA, COB, LADWP, and the ISO.

- Develop the powerflow base cases to be used in the analysis and obtain comments on these cases from COB, Glendale, and LADWP.

- Perform the required technical analysis (powerflow, post-transient, transient stability, and short circuit) on these base cases and document the results.

- Coordinate the study activities with the ISO.

#### 3.6.4.1 Transmission System Reliability Criteria

The Study was conducted by applying, as appropriate, the transmission planning criteria and guidelines of the COB, LADWP, Edison, as well as the reliability criteria of the California ISO. More specifically, the main criteria applicable to the Study are as follows:

- Load Flow Assessment. The following contingencies were considered for transmission lines and transformer banks (as noted):

- Single contingencies (N-1):

    (1) All 12.5 kV, 13.8 kV, 34.5 kV and 69 kV lines and transformers on the COB and Glendale systems.

(2) All 230 kV and 500 kV lines and transformers on the LADWP and Edison systems.

- Double contingencies (N-2):

(1) Credible outages of two 34.5 kV and/or 69 kV lines on the COB and Glendale systems.

(2) Credible outages of two 230 kV and/or 500 kV lines on the LADWP and Edison systems.

(3) Credible outages of one 230 kV or 500 kV line and one 500/230 kV transformer on the LADWP and Edison systems.

Loading Criteria. The loading criteria applied in the Study are summarized in Table 3.6-1.

Post-Transient Voltage Assessments. The post-transient voltage deviation and reactive margin criteria applied in the Study are summarized in Table 3.6-2.

Stability Assessments. The Study simulated system performance for a minimum of 15 seconds and utilized the following criteria:

- All machines in the system shall remain in synchronism as demonstrated by their relative rotor angles

- System stability will be evaluated based on the damping of the relative rotor angles and the damping of the voltage magnitude swings.

- Transient voltage dips above 0.80 p.u. at Adelanto and Sylmar should be maintained.

- Other transient voltage dips and transient frequency deviations must meet the WSCC Reliability Criteria for Performance Levels A and C (N-1 and N-2 outages).

Congestion Assessment

The following principles will be used for accommodating generation into the Edison transmission system which falls under the CA-ISO jurisdiction.

- Enough capacity shall be maintained to accommodate all Reliability Must-Run and Regulatory Must-Take generation resources with all facilities in services.

- Enough capacity shall be maintained to accommodate the total output of any one generator which is not classified as Reliability Must-Run.

- The ISO protocol on congestion management shall apply when two or more generators which are not classified as Reliability Must-Run exceed the available capacity of the system.

**TABLE 3.6-1**

**TRANSMISSION LINE AND TRANSFORMER LOADING CRITERIA (All Values in % of Normal Loading Criteria)**

| | | System | | | |
|---|---|---|---|---|---|
| | | **Burbank** | **Glendale** | **LADWP** | **Edison** |
| Transmission Lines | Base Case (N-0) | 100 | 100 | 100 | 100 |
| | N-1 Contingencies | 115 | 100 | [1] | 115 |
| | N-2 Contingencies | 135 | 100 | [1] | 135 |
| Transformers | Base Case (N-0) | 100 | 100 | 100 | 100 |
| | Long Term (24 hours) | 110 | 100 | [1] | 110 |
| | Short Term (1 hour) | 150 | 100 | [1] | 150 |

[1] Use "MVA2" ratings in powerflow data set.

**TABLE 3.6-2**

**POST-TRANSIENT VOLTAGE DEVIATION AND REACTIVE MARGIN CRITERIA**

| | | System | |
|---|---|---|---|
| | | **LADWP** | **Edison** |
| Maximum Allowable Voltage Deviations (%) | N-1 Contingencies | 5 | 7 |
| | N-2 Contingencies | 10 | 10 |
| Minimum Reactive Margin Requirements (MVAR) | N-1 Contingencies | | |
| | 230-kV | -- | 177 |
| | 500-kV | [1] | 220 |
| | N-2 Contingencies | | |
| | 230-kV | -- | 89 |
| | 500-kV | [2] | 110 |

[1] 500 MVAR at Adelanto and Victorville.
[2] 250 MVAR at Adelanto and Victorville.

**System Conditions**

The Study assessed the five scenarios summarized in Table 3.6 -3

**TABLE 3.6-3**

**SCENARIOS EVALUATED**

| | **Scenario** | | | | |
|---|---|---|---|---|---|
| | **1** | **2_250** | **2_328** | **3_250** | **3_328** |
| Magnolia Project MW | 0 | 250 | 328 | 250 | 328 |
| Burbank-Glendale Ties | Open | Open | Open | Closed | Closed |

The starting point base case for these studies was a 2005 summer peak base case prepared by Edison for use in its 2000 Transmission Assessment. This case was modified to reflect:

1. The addition of the following merchant power projects being proposed for development on the Edison system:

    a. The 750 MW Pastoria Project
    b. A 560 MW project interconnected with the Mesa-Redondo 230-kV line
    c. A 870 MW project interconnected with the Laguna Bell 230-kV Substation
    d. 740 MW of additional generation at Alamitos and Huntington Beach

2. The addition of detailed models for the systems of the Cities of Burbank, Glendale, and Pasadena.

3. The addition of the following proposed generating facilities on the LADWP system:

    a. The 547 MW Valley Repower Project

    b. 100 MW of additional generation at Haynes

    c. 235 MW of additional generation at Harbor

    d. The 273 MW Florida Power Light Energy wind farm project interconnected with the Owens Gorge-Rinaldi 230 kV line

### 3.6.4.2 Preliminary Transmission System Interconnection Study

The entire Study is presented in Appendix Q (note, as of April 10, 2001 only the powerflow and reactive margin analyses have been completed). In summary, the Study indicates that:

1. The interconnection of a 250 MW Project with the COB system has no negative impacts on the COB system or the external systems (Glendale, LADWP, and SCE).

2. No negative impacts on the COB system or the external systems would occur if a 250 MW Project is developed and the Burbank-Glendale 69-kV ties were operated in a closed fashion.

3. The interconnection of a 328 MW Project with the COB system has no negative impacts on the external systems (Glendale, LADWP, and SCE). However, overloads (of 20%) are noted on one of the MPP-Olive 69-kV lines after an outage of the other MPP-Olive 69-kV line. Should the 328 MW MPP configuration be developed, cables with sufficient capacity will be installed such that one of the cables will not overload due to an outage on the other.

4. If the Burbank-Glendale 69-kV ties are operated in a closed fashion with a 328 MW MPP on-line, overloads (of as much as 19%) are noted on the 69-kV facilities supporting the Burbank-Glendale ties for certain N-1 outages. Mitigating these overloads will be accomplished by opening the overloaded tie line via a remedial action scheme (RAS). Studies indicate that doing so will not have a negative impact on the Burbank or Glendale systems.

5. The reactive margin analysis indicated that:

   (a) The reactive margins at the Victorville, Toluca, and Rinaldi 500-kV busses are consistently well in excess of existing criteria.

   (b) The reactive margins at the Toluca and Rinaldi busses tend to improve slightly due to the addition of the MPP; the greatest improvements occur with the 328 MW MPP.

6. The post-transient voltage deviation studies performed indicate that the presence of the MPP (at either 250 MW or 328 MW) does not have a negative impact on or may slightly improve post-transient voltage deviations.

#### 3.6.4.3 Electric and Magnetic Fields

Given the proposed design of the underground 69 kV transmission lines and the use of shielded cable, there will be no electric field outside of the cable. Therefore, with the use of shielded cable (located over 48 inches below ground), the project will not produce any electric field levels at the surface.

Magnetic fields will result from the interconnection of the proposed generating units to the Olive Switchyard via the proposed transmission lines. With three individual cables per circuit being located in PVC conduit within concrete encased duct bank, the cables will be installed in a manner to reduce magnetic fields. However, it is expected that some magnetic fields emanating from the proposed underground transmission lines will be measurable at the surface above the duct bank(s). These areas along the cable route will not be accessible by the public. Furthermore, the area being proposed for MPP already contains a variety of electricity generating facilities and associated equipment, including gas-fired generation units, switchyards, and overhead and underground transmission, and subtransmission and distribution lines. These existing electrical facilities already produce measurable electric and magnetic fields within the COB MPP complex site. Ambient electric and magnetic field levels within the site can be measured, and projected magnetic field levels can be calculated once conceptual design is completed later in the project.

### 3.6.5 Facility Switchyard

The electrical interconnection for the MPP will include the expansion of the existing COB Olive 69 kV Switchyard. The switchyard will be expanded to the east of the existing facility. The expanded area will measure approximately 118 feet by 93 feet. It will include two new switchyard bays to accommodate the two proposed 69 kV transmission lines and one measuring (voltage) bay (Figure 3.4-2). The expansion will occur on COB property behind the existing 12-foot concrete block architectural wall that currently screens the existing switchyard from motorists and pedestrians on Olive Avenue. No additional city or private property will need to be acquired or used for the switchyard expansion.

The switchyard expansion will require the relocation of existing gas delivery facilities to Olive Units 1 and 2. These pipelines, valves, and interconnection facilities will need to be moved to another location on COB property. This activity will be coordinated with the SoCalGas and planned outages of Olive Units 1 and 2. The relocation will require some construction in Olive Avenue and within the MPP complex to move these facilities approximately 200 feet to the east on the site.

#### 3.6.5.1 Equipment

The switchyard expansion will include, but not be limited to, the following outdoor equipment and materials:

- Power circuit breakers (dead tank, SF6 gas insulated type)
- Disconnect switches (air break, manual group operated)
- Surge arresters (station class, MOV type)
- Voltage transformers
- Current transformers (located on the power circuit breaker bushings)
- Insulators (station post and suspension)
- Raceway system (direct buried conduit)
- Lighting (security and emergency egress only)
- Perimeter security fence.

#### 3.6.5.2 Bus Configuration

The existing switchyard is arranged in a double bus single breaker configuration with a total of twelve existing bays and one future bay. Existing Section A-1 consists of five bays, existing Section A-2 consists of four bays, and existing Section A-3 consists of three bays and one future bay. Each existing double bus section is separated by bus tie circuit breakers. The switchyard expansion will consist of a new Section A-4 that will be connected to existing Section A-3 and will be separated by two new bus tie circuit breakers. The new Section A-4 will include two new switchyard bays to accommodate the two proposed 69 kV transmission lines and one measuring (voltage) bay.

#### 3.6.5.3 Electrical Ratings

The switchyard expansion will be designed to maintain the following clearances and spacings:

- Nominal voltage - 69 kV
- Maximum voltage, phase-to-phase - 72.5 kV
- Basic impulse insulation level (minimum) - 350 kV
- Minimum metal-to-metal phase spacing - 31 inches
- Minimum disconnect switch center-to-center phase spacing - 60 inches
- Minimum phase-to-ground clearance - 25 inches
- Continuous current rating - 3,000 A
- Short-circuit current rating - 40 kA.

### 3.6.5.4 Bus System

The switchyard expansion will utilize a conventional air-insulated bus design with a bus conductor system consisting of copper tubular bus and stranded aluminum jumper conductor. All rigid bus spans will contain a stranded cable vibration damper. Allowable rigid bus spans will be calculated utilizing the techniques described in the IEEE Guide for Design of Substation Rigid-Bus Structures, Document P605/D4. Bus sag will be limited to an amount not greater than the bus diameter. Ice will not be considered for bus sag. Bus slip and expansion fittings will be installed in the main and auxiliary busses to allow for movement. The rigid bus span will be limited so that the bus conductor and bus supporting insulators will withstand the simultaneous application of a high wind pressure and the maximum available fault current load.

### 3.6.5.5 Direct Stroke and Surge Protection

The Olive Switchyard expansion will be protected from lightning by surge arrestors. An engineering assessment will be performed to determine the best locations.

### 3.6.5.6 Grounding

The grounding system for the switchyard expansion will be in accordance with IEEE Standard 80, Safety in Switchyard Grounding. The new ground grid will consist of buried copper ground connectors and ground rods connected in a grid configuration. The conductors will be interconnected with an exothermic welding process and be buried at a minimum depth of 18 inches below grade. The new ground grid for the switchyard expansion will be connected to the existing switchyard ground grid and will be designed to keep the calculated step and touch potentials to safe levels as defined by IEEE 80. The overall ground grid design will be based on a maximum fault current of 40 kA with a duration of 0.25 second.

### 3.6.5.7 Control Building Expansion

The existing switchyard control building will be expanded to relocate the existing DC battery to make space for the new protection equipment associated with the switchyard expansion. The control building expansion will essentially duplicate the architectural features of the existing control building. The exact size of the battery room expansion will be determined as part of the final switchyard engineering.

### 3.6.5.8 AC Station Service

It is anticipated that the existing AC station service has sufficient spare capacity to serve the new equipment AC loads. If existing spare AC panel-board breakers are not readily available, a new AC panelboard will be installed to feed the new equipment AC loads, which will include circuit breakers heaters, equipment cabinet heaters and yard lighting. The existing AC station service capacity will be verified as part of the final switchyard engineering.

### 3.6.5.9 DC Station Service

It is anticipated that the existing switchyard 125 volt DC system has sufficient spare capacity for the new equipment DC loads. If existing spare DC panelboard breakers are not readily available, a new DC panelboard will be installed to feed the new equipment DC loads that will include the circuit breaker trip circuits, circuit breaker close circuits, and protective relay systems. The existing DC battery size will be verified as part of the final switchyard engineering using IEEE Std 485-1983 Recommended Practice for Sizing Large Lead Storage Batteries for Generating Stations and Substations and the following criteria:

- Nominal battery voltage - 125 VDC
- Number of cells - 60
- Emergency operating time - 8 hours
- Minimum cell voltage - 1.75 volts
- Lowest expected electrolyte temperature - 65° F
- Specific gravity at rated capacity - 1.215
- Plate type - Lead calcium.

The existing battery charger size will be verified as part of the final switchyard engineering to ensure that it can carry the ultimate design load and will be capable of recharging the battery in eight hours.

### 3.6.5.10 Control and Protection

The protective relay system will be designed to remove or alarm abnormal operating occurrences on equipment, limit damage to faulted equipment, minimize possibility of fire or explosion, and minimize hazard to personnel. The protective relay schemes will include protection of the transmission lines, switchyard bus expansion, and circuit breakers. The protective relay system will be a coordinated application of either individual relays, multifunction relays, or a combination of individual and multifunction relays. The specific relay types will be determined as part of the final switchyard engineering. All protective relays will be selected to coordinate with protective devices supplied by manufacturers of major equipment and the thermal limits of electrical conductors and electrical equipment, such as cables, transformers, and motors. Secondary current produced by current transformers will be in the five ampere range, and voltage signals produced by voltage transformers will be in the 120 volt range.

Control of the transmission line circuit breakers will be included in the generation plant's control scheme. Control of the bus tie circuit breakers will be included in the switchyard expansion control scheme.

### 3.6.5.11 Supervisory Control and Data Acquisition

The switchyard expansion will be an unmanned facility. The COB generation plant operator will maintain control of the two transmission line circuit breakers. The generation plant operator will be provided with full metering, status, and alarm information. Remote monitoring of the facility will also be performed via the existing Supervisory Control and Data Acquisition (SCADA) system. Remote control of the bus tie circuit breakers will also be performed via the SCADA system.

### 3.6.5.12 ISO Metering

The metering installation will conform to the latest revision of the ISO "Field Metering Test, Audit, and Certification Criteria" protocol document. Three-phase, four wire, three element, 0.2 percent accuracy revenue quality meters will be provided.

### 3.6.5.13 Site Grading and Drainage

The general elevation of the switchyard will remain essentially unchanged. Grading for the switchyard expansion will be designed such that drainage may be achieved through the use of surface runoff directed towards existing catch basins and/or storm drains. The surface runoff drainage design will use a minimum slope of 1/150.

### 3.6.5.14 Oil Containment

Because no large oil-containing equipment will be located within the switchyard expansion area, and only small amounts of insulating oil are contained in the instrument (voltage) transformers, oil containment facilities are not required by 40 CFR Part 112.

### 3.6.5.15 Site Surface

The switchyard expansion will be surfaced with six inches of compacted crushed rock. After subgrade preparation and prior to applying the crushed rock surface, a nontoxic vegetation eradicator will be applied.

### 3.6.5.16 Security Fencing

A perimeter fence consisting of a seven-foot high galvanized chain link fabric with a one-foot barbed wire extension on top will enclose the switchyard expansion. One 16-foot chain link swing gate will be located in the northeast corner of the expanded switchyard to provide access to a perimeter drive around the switchyard area. In addition, a three-foot walk gate will also be provided for pedestrian access near the drive entrance.

## 3.7 PIPELINES

### 3.7.1 Introduction

The MPP includes the following pipelines:

- Natural gas supply pipeline (tap in at edge of site and onsite)
- Potable water supply line (onsite only)
- Well water (onsite only)
- Reclaimed water supply line (onsite only)
- Wastewater discharge line (onsite only)
- Fire water supply line (onsite only).

### 3.7.2 Natural Gas Supply Line

Natural gas will be delivered to the plant site by SoCalGas using the existing lines onsite or adjacent to the site.

New gas metering and regulator stations will be provided on the east side of the site as shown on the site arrangement (Figure 3.4-2). It is anticipated that the gas to the CTG will be metered by the gas company, then compressed by the compressors, and then the flow controlled by the CTG flow control valves. A new metering and regulator station will be provided for the existing facilities. Another new regulator station may be provided for the HRSG duct burner gas supply.

### 3.7.3 Water Supply Lines

Anticipated fresh water demand can be supplied via the existing water system on the site.

#### 3.7.3.1 Reclaimed Water Supply Lines

Reclaimed water will be supplied to the generating plant by the COB, the local water purveyor.

### 3.7.4 Wastewater Discharge Line

Wastewater from the proposed generating plant will be discharged to the COB's Burbank Western Channel located along the eastern property line.

## 3.8 PROJECT CONSTRUCTION

Construction of the plant from site preparation and grading to commercial operation is anticipated to commence in early 2002 and proceed for approximately 23 months.

### 3.8.1 Power Plant Facility

#### 3.8.1.1 Construction Schedule and Workforce

The construction and startup plan is based on a single shift, 5 x 10 hour/day workweek. Overtime and shift work may be used to maintain or enhance the construction schedule. Construction will most typically take place between the hours of 6 a.m. and 6 p.m., Monday through Friday. Staggered crews and additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. During the startup phase of the project, some activities may continue 24 hours per day, seven days per week.

Table 3.8-1 indicates the projected total construction craft manpower by month for the facility. An estimated peak of 320 craft and professional personnel is anticipated in months 14 and 15 following commencement of construction.

#### 3.8.1.2 Construction Plans

A general contractor will be selected for the design, procurement, and construction of the facility. Subcontractors will be selected by the general contractor for specialty work portions as needed.

**3.8.1.2.1 Mobilization**. The general contractor will mobilize within five months after full notice to proceed. Initial site work includes site grading and storm water control. While most project-related areas are paved, crushed rock surfacing will be used for temporary roads, laydown, and work areas.

**3.8.1.2.2 Construction Office Facilities.** Existing onsite buildings, mobile trailers, or similar suitable facilities (e.g., modular offices) will be used as construction offices for owner, contractor, and subcontractor personnel.

**3.8.1.2.3 Construction Parking.** Areas near the site will be used for construction parking. If necessary, buses will be used to transport workers from the parking areas to the construction site. These areas will provide adequate parking space for construction personnel and visitors during construction and will be maintained for stability and safety.

## TABLE 3.8-1

## CONSTRUCTION PERSONNEL REQUIREMENTS BY TRADE

| Craft or Trade | Month of Construction | | | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| Boilermaker | | | | | | | | | | | | | 22.1 | 52.4 | 66.6 | 65.4 | 52.9 | 32.2 | 15.6 | | | | | | 307.2 |
| Carpenters | | | | 49.3 | 74.6 | 61.1 | 23.3 | | | | | | | | | | | | | | | | | | 208.3 |
| Cement Finisher | | | | 4.0 | 6.1 | 5.0 | 1.9 | | | | | | | | | | | | | | | | | | 17.1 |
| Electricians | | | | | | | | 17.7 | 31.8 | 39.5 | 43.9 | 45.7 | 45.0 | 42.1 | 37.3 | 30.9 | 23.0 | 14.2 | 4.8 | | | | | | 376.0 |
| Insulators | | | | | | | | | | | | | | 14.3 | 23.2 | 23.0 | 16.6 | 6.0 | | | | | | | 83.1 |
| Ironworker | | | | 46.7 | 70.5 | 126.4 | 125.7 | 85.0 | 32.4 | | | | | 4.3 | 7.3 | 8.4 | 8.1 | 6.6 | 4.4 | | | | | | 525.6 |
| Laborer | | | 38.2 | 75.4 | 61.0 | 32.8 | 12.5 | | | | | | | | | | | | | | | | | | 219.9 |
| Millwright | | | | | | | | | | | | | 3.4 | 11.8 | 16.6 | 17.4 | 15.2 | 10.8 | 6.2 | | | | | | 81.3 |
| Operators | | 13.2 | 19.1 | 21.9 | 23.5 | 24.2 | 24.3 | 23.8 | 22.7 | 21.2 | 19.3 | 17.0 | 14.3 | 11.4 | 8.3 | 5.1 | 1.7 | | | | | | | | 271.0 |
| Painters | | | | | | | | 11.1 | 16.8 | 13.8 | 5.3 | | | | | | | | | | | | | | 47.1 |
| Pipefitters | | | | | | | | | | | | | 69.0 | 112.6 | 113.2 | 84.0 | 34.8 | 3.3 | | | | | | | 416.8 |
| Teamster | | | 9.6 | 12.2 | 5.2 | | | | | | | | | | | | | | | | | | | | 27.0 |
| Total Manual Staff | | 13.2 | 66.9 | 209.5 | 240.9 | 249.5 | 187.7 | 137.6 | 103.8 | 74.5 | 68.5 | 62.6 | 153.8 | 248.8 | 272.6 | 234.1 | 152.2 | 73.2 | 30.9 | | | | | | 2,580.4 |
| Total Indirect Craft | | | 6.0 | 8.0 | 11.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 11.0 | 9.0 | 6.0 | 6.0 | | 217.0 |
| Total SU Craft | | | | | | | | | | | | | | | | | 1.3 | 3.2 | 4.5 | 4.8 | 6.9 | 11.0 | 9.0 | 7.8 | 48.5 |
| Total CM Staff | 4.0 | 16.0 | 18.0 | 22.0 | 25.0 | 28.0 | 28.0 | 28.0 | 30.0 | 29.0 | 30.0 | 30.9 | 32.0 | 31.0 | 35.2 | 36.0 | 34.5 | 35.0 | 34.0 | 34.9 | 27.0 | 22.0 | | 19.0 | 640.4 |
| Total Site Staff | 4.0 | 29.2 | 90.9 | 239.5 | 276.9 | 289.5 | 227.7 | 177.6 | 145.8 | 115.5 | 110.5 | 104.5 | 196.8 | 290.8 | 318.8 | 281.1 | 199.0 | 122.4 | 80.5 | 50.6 | 42.9 | 39.0 | 15.0 | 26.8 | 3,486.3 |

**3.8.1.2.4 Laydown and Storage.** Areas within the site boundary will be used as off-load and staging areas. Additional lay-down space will be required offsite to temporarily store construction materials and plant equipment prior to installation.

Materials and equipment staging areas are needed for construction. These areas serve as base stations where employees report at the start and end of each day's activities. Staging areas are used for other activities and functions including field office locations, lay-down areas, storage of materials, storage of equipment and vehicles, a mechanic's garage, and security of the above items. These staging areas will be located on the project site during the detailed design phase of the project.

**3.8.1.2.5 Emergency Facilities.** Emergency services will be coordinated with the local fire department and hospital. An urgent care facility will be contacted to set up non-emergency physician referrals. First aid kits will be provided around the site and regularly maintained. At least one person trained in first aid will be part of the construction crew. In addition, all foremen and supervisors will be given first aid training.

Fire extinguishers will be located throughout the site at strategic locations at all times during construction.

**3.8.1.2.6 Construction Utilities.** During construction, temporary utilities will be provided for the construction offices, lay-down area, and the project site.

Temporary construction power will be supplied by the COB. Area lighting will be provided and strategically located for safety and security.

Construction water will be provided by the COB from local supply and will be provided to the construction area.

Drinking water will be distributed daily. Average daily use of construction water is expected to be about 5,000 gallons. During hydrotest, water usage is estimated at 20,000 gpd. Used hydrotest water will be discharged into the storm drainage system.

Portable toilets will be provided throughout the site.

**3.8.1.2.7 Site Services**. The following site services will be provided by the general contractor:

- Environmental health and safety training
- Site security

- Site first aid
- Construction testing (e.g., nondestructive examination (NDE), hydro)
- Site fire protection and extinguisher maintenance
- Furnishing and servicing of sanitary facilities
- Trash collection and disposal
- Disposal of hazardous materials and waste in accordance with local, state, and federal regulations.

**3.8.1.2.8 <u>Construction Materials and Equipment</u>.** Truck deliveries of construction materials and equipment will generally occur on weekdays between 6:00 a.m. and 6:00 p.m. Materials such as concrete, pipe, wire and cable, fuels, reinforcing steel, and small tools and consumables will be delivered to the site by truck. Most of the heavy equipment items will be transported by rail. Rail deliveries will be offloaded and transported to the site. Site access will be controlled for personnel and vehicles. A security fence will be installed around the plant site boundary.

### 3.8.2 Transmission Lines

The MPP will require the installation of two 69 kV transmission lines to facilitate the electrical interconnection between the proposed CTG (and STG) generating facility and the Olive 69 kV Switchyard. The lines will measure approximately 1,380 feet from the CTG and 1,240 feet from the STG to the switchyard, with both being placed underground in PVC conduit encased in concrete duct bank. The entire project will be constructed within the COB power plant complex.

#### 3.8.2.1 <u>Construction Schedule and Workforce</u>

Construction of the proposed transmission lines will commence after the required demolition work is completed within the MPP complex. This planned demolition will include the removal of the remaining components of Magnolia Units 1 and 2, associated cooling towers, and selected aboveground and underground fuel storage facilities. Demolition and removal activities are expected to begin in early 2002 and take approximately six months. Construction of the transmission line duct banks will take approximately three months to complete during the last half of the demolition activities. Care will need to be taken to avoid existing underground facilities during duct bank trench excavation. The transmission lines need to be completed three months before scheduled commercial operation of the new plant to allow time for unit operation for tuning and testing. The new CTG may be in commercial operation as early as March 31, 2004.

The transmission lines will be constructed by small, specialized crews skilled in duct bank construction and cable pulling. At any one time, eight to ten workers can be expected onsite as part of the transmission line construction effort. It is expected that all skilled and unskilled labor needed to construct the underground transmission lines will be available in the southern California area. Construction equipment will likely consist of at least one large track hoe and dump trucks for trench excavation, cement trucks and various types of material delivery vehicles, a large lifting crane to set the manholes, and utility vehicles.

#### 3.8.2.2 Construction Plan

Several phased tasks will be required to construct the underground 69 kV transmission lines between the proposed combustion turbine generating facility and the existing Olive Switchyard. These will include the following:

- Surveying
- Soil borings
- Pavement cutting and excavation
- Duct bank construction
- Manhole installation
- Cable pulling and splicing
- Termination attachments
- Testing
- Energization.

Given the projected load that will be generated by the CTG and STG, two 69 kV circuits will be required to interconnect this load to the Olive Switchyard and, eventually, the COB and LADWP transmission grid. Depending on ampacity calculations relative to the thermal characteristics of the surrounding soil, final number and size of cables required, and spare conduit needs, the two 69 kV transmission lines could be placed in one wide duct bank or two smaller duct banks.

Pavement will be either broken or cut, and the trench excavated by a large track hoe. The excavated trench for the duct bank will be approximately six inches to one-foot wider than the final designed duct bank, and could be from 60 to 80 inches deep. Six-inch PVC conduits will be placed three inches apart within the duct bank and at least three inches from the top, bottom, and sides of the duct bank. Four conduits will be installed for each phase of each 69 kV circuit. Three of the conduits will be used for each three-phase circuit, with the fourth being available as a spare. Several spare conduits will also be included in the duct bank design to accommodate additional future circuits or to replace damaged conductor. Duct bank construction will begin before the entire route is excavated. The duct bank will be constructed of high strength thermal concrete, with the top of the duct bank being placed a minimum of 48 inches below grade. Backfill above the duct bank will consist of earth or low strength thermal concrete, with the finished pavement on top of the backfill.

At least two large manholes will be required to assist in cable installation. They each will measure approximately 20 feet long by 10 feet wide by eight feet deep. They will consist of precast concrete and will likely be delivered by truck to the site in two or three sections. Final assembly will occur at the site, using a large lifting crane to set the sections in the excavated trench. The manholes will provide access to the cables for pulling and splicing during cable installation, and for maintenance and possible cable repair or replacement if a fault occurs. Underground cables will then be pulled through conduits.

Once the cables and accessories have been installed, field acceptance testing will be performed to determine if any damage or defects have occurred as a result of installing, terminating, or splicing the cables. Upon satisfactory completion of field acceptance testing, cable energization can occur.

#### 3.8.2.3 Materials and Equipment Staging Areas

Material and equipment staging areas will be provided by the COB on their MPP complex site. No off-site storage or staging areas are expected to be required for the electrical interconnection phase of the MPP. Some off-site storage may be utilized for material long-term storage.

#### 3.8.2.4 Transmission Line Construction Safety Practices

Construction of the proposed 69 kV transmission lines will be performed in a manner that meets or exceeds the safety standards, rules, regulations, and requirements of the National Electrical Safety Code (NESC), U.S. Occupational Safety and Health Administration (OSHA), the State of California, and the COB. In addition, the safety program of the selected contractor(s) will be reviewed and approved by the COB prior to any construction activities.

### 3.8.3 Switchyard

The MPP will require the installation of two 69 kV double bus single breaker switchyard bays and two bus tie circuit breakers to facilitate the electrical interconnection between the proposed combustion turbine (and steam turbine) generating facility and the Olive 69 kV Switchyard. The new switchyard bays will essentially be designed to duplicate similar structures and equipment spacings in the existing switchyard bays. The entire project will be constructed within the COB MPP complex.

### 3.8.3.1 Construction Schedule and Workforce

Construction of the proposed switchyard expansion will commence after the required demolition work is completed within the MPP complex. This planned demolition will include the relocation of the existing gas delivery facility for Olive Units 1 and 2. Demolition and removal activities are expected to begin in early 2002 and take approximately one month. Construction of the switchyard expansion will take approximately six months to complete. Care will need to be taken to avoid existing underground facilities during the foundation, grounding, and raceway installation. The switchyard expansion needs to be completed three months before scheduled commercial operation of the new plant to allow time for unit operation for tuning and testing. The new CTG may be in commercial operation as early as March 31, 2004.

Small, specialized crews skilled in switchyard erection and electrical wiring will construct the Olive Switchyard expansion. At any one time, six to 10 workers can be expected onsite as part of the switchyard expansion construction effort. It is expected that all skilled and unskilled labor needed to construct the switchyard expansion will be available in the southern California area. Construction equipment will likely consist of a drilling rig, lifting crane, track hoe, dump trucks, cement trucks, various types of material delivery vehicles, and utility vehicles.

### 3.8.3.2 Construction Plan

Several phased tasks will be required to construct the switchyard expansion. These will include the following:

- Surveying
- Gas Facility Relocation
- Soil Borings
- Pavement Cutting and Excavation
- Grading and Filling
- Security Fencing Installation
- Foundation Installation
- Structure and Equipment Erection
- Grounding Installation
- Raceway Installation
- Control Cable Installation
- Control Building Expansion
- Control and Protection Modifications and Additions
- Aggregate Surfacing

- Testing and Checkout
- Energization.

#### 3.8.3.3 Materials and Equipment Staging Areas

Material and equipment staging areas will be provided by the COB on their MPP complex site. No off-site storage or staging areas will be required for the switchyard expansion phase of the MPP.

#### 3.8.3.4 Switchyard Construction Safety Practices

Construction of the proposed switchyard expansion will be performed in a manner that meets or exceeds the safety standards, rules, regulations, and requirements of the NESC, OSHA, the State of California, and the COB. In addition, the safety program of the selected contractor(s) will be reviewed and approved by the COB prior to any construction activities.

### 3.8.4 Pipeline Construction

No off-site pipelines will be constructed to support the MPP. Section 3.7 of this AFC provides further discussion on pipeline service requirements.

### 3.8.5 Land Disturbance

A summary of estimated land disturbance for the MPP, including the construction and operation phases for the generation facility, transmission line, and pipelines is presented in Table 3.8-2.

**TABLE 3.8-2**

**ESTIMATED LAND DISTURBANCE FOR THE MPP**

| Project Component/Item | Length/ Frequency of Units | Acreage Subtotal | |
|---|---|---|---|
| | | Construction | Operation |
| Generation Facility | -- | -- | -- |
| Site Boundary | -- | 3.0 | 3.0 |
| Temporary Construction Laydown, Parking, Offices, Access | -- | 6.5 | 0 |
| Subtotal | | 9.6 | 3.1 |
| Transmission Line[1] | | | |
| Combustion Turbine GSU to Switchyard | 1,260 feet | 0.14 | 0.14 |
| Steam Turbine GSU to Switchyard | 990 feet | 0.10 | 0.10 |
| Subtotal | | 0.24 | 0.24 |
| Pipelines[2] | | | |

[1] Land disturbance estimates are based on a construction trench 52 inches wide for the installation of the 40-inch wide, concrete-encased duct bank. An additional 360 square feet of area will be disturbed for each 10-foot by 20-foot manhole along the duct bank route.

[2] Following construction, the land surface would generally be allowed to return to its pre-construction use.

## 3.9 FACILITY OPERATION

### 3.9.1 Introduction

This section discusses operation and maintenance procedures that will be undertaken by the project operation and maintenance contractor to ensure safe, reliable, and environmentally acceptable operation of the power plant, transmission system, and off-site pipelines. Additional information regarding operation of the power plant is presented in Appendix D (Control Engineering Design Criteria) with respect to coordinated control and monitoring of the power plant systems.

The operational workforce for the proposed MPP will be about 30 full-time employees. Plant operations will be controlled from CRT/LCD based operator work stations that will be located in the control room. A DCS type plant control system will provide modulating control, digital control, and monitoring and indicating functions for operation of the plant power systems.

### 3.9.2 Combined Cycle Facility

MPP is a one unit, combined cycle facility designed to serve the SCPPA members. To meet marketplace requirements of the Participating Members, the overall design of the Facility will put a high emphasis on flexibility and efficiency.

At an ambient temperature of 95º F, the CTG has a nominal output of 169 MW and the STG a nominal output of 85 MW, for a total nominal plant output of approximately 250 MW at full load.

#### 3.9.2.1 <u>Operation with Seasonal Variation in Ambient Temperature</u>

Unit output is sensitive to the temperature and density of the ambient air taken into the CTG inlet and used in the combustion process. Evaporative coolers will be added to the CTG inlet air treatment system to reduce the inlet air temperatures whenever the ambient temperature is higher than 50° F.

#### 3.9.2.2 <u>Annual Operating Practices</u>

Generally, the plant will be operated to provide its maximum electrical output during the summer peak periods when the demand for electricity is highest.

Planned maintenance will be coordinated with demand fluctuations so that outages occur during periods of low demand. Normally, this work will be planned during non-peak periods when electrical demand is low.

### 3.9.2.3 Control Philosophy

The control system will consist of a state-of-the-art, integrated, microprocessor-based DCS. The control system will provide for startup, shutdown, and control of plant operation limits and will provide protection for the equipment.

Interlock and logic systems will be provided via hard-wired relays, the DCS, and/or PLCs.

Process switches (i.e., pressure, temperature, level, flow) used for protective functions will be connected directly to the DCS and the protective system.

### 3.9.2.4 Degree of Automation

The plant will be designed with automation where practical in order to reduce the required actions performed by operating personnel. Where it is not beneficial, systems will not be automated. Through subsystem automation and use of the DCS, the number of individual control switches and indicators that confront the operator will be greatly reduced. This will reduce the complexity and size of the main control room work stations and panels.

### 3.9.2.5 Centralized Control

The majority of the equipment that is required to support the operation of the plant will be located in the control and electrical equipment rooms. The control room contains the DCS CRT based operator work stations and the auxiliary control panels. In addition, the control room contains the alarm, utility, and log printers.

Local control panels or stations will be furnished only where operator attention is required to set up a system for operation, or where the equipment requires intermittent attention during plant operation. Main control room indication and control will only be duplicated for those variables critical to plant availability.

### 3.9.2.6 Distributed Control and Monitoring System

**3.9.2.6.1 DCS Configuration.** Functionally distributed and redundant microprocessor-based controllers will communicate via a redundant, high speed communications network. The communications network will provide unit-wide data access for centralized operation through operator work stations.

Remote I/O will be used where practical to reduce the quantity of long cable runs for the DCS interface with remote equipment.

**3.9.2.6.2 DCS Functions and Tasks.** The DCS will perform the following functions and miscellaneous tasks:

- Perform analog and digital plant control functions to accommodate a consistent operator interface for controlling the power plant equipment.
- Monitor both analog and digital signals to provide the operator/engineer with access to data around the plant.
- Perform alarm monitoring in the main control room for the entire plant.
- Provide graphic displays, including both control and information type displays, for all systems and equipment, including electrical systems.
- Provide data logging and reporting via displays and printed reports.
- Provide long-term data storage of process history.

#### 3.9.2.7 Reliability

Critical functions and parameters will have redundant sensors and controls. Measurement redundancy will be provided for all critical plant parameters. The control system will be designed with a redundancy level such that critical controls and indications do not fail due to a single component failure.

Control systems in general, and especially the protection systems, will be designed according to stringent reliability criteria.

DCS microprocessors will be fully redundant with automatic tracking and switchover capability in the event of a failure of the primary microprocessor. Two fully redundant data communications networks will be provided. The system will permit either network to be disconnected and reconnected while the system remains on line and in control. The control system will incorporate on-line, self-diagnostic features to verify proper operation of system hardware, software, and related support functions such as control power, field contact interrogating power, and system modules in position.

### 3.9.3 Transmission Lines and Switchyard

Operation of the electrical interconnection facilities will be locally controlled via control and protection equipment at the new generating plant and at the existing (and expanded) control building in the Olive 69 kV Switchyard. Operation will also be remotely monitored and controlled via the COB SCADA system. Maintenance activities for the 69 kV transmission line and switchyard will be performed by COB in accordance with their standard transmission and switchyard maintenance procedures. Once the newly generated power leaves the COB MPP complex, it will be controlled by control and protection equipment of the LADWP and the participating SCPPA municipal utilities, including the COB.

Typical operation and maintenance functions for a transmission line within the MPP complex will be to periodically inspect the terminations of the line at the GSUs and in the switchyard to ensure that they are functioning properly. Likewise, if any splicing was done in manholes, the splices will be periodically inspected as well. As the transmission line will be located in a controlled environment with limited potential for damage from non-utility construction activities, inspections every six or 12 months are anticipated. The switchyard control, protection, and metering equipment will be periodically tested for proper operation and calibration approximately every 12 months in accordance with the COB standard switchyard maintenance procedures. The maintenance functions will likely be coordinated with the COB's normal maintenance practices for the entire MPP complex.

#### 3.9.3.1 Access Maintenance

As the proposed transmission lines will be placed entirely underground within COB-controlled property, access to the lines will not require any form of maintenance. The COB will use the route of the lines for surface service roads within the MPP complex. No structures will be placed above the underground transmission lines. In addition, unrestricted access to the line's terminations and the manholes will be maintained for authorized COB personnel. The switchyard will be provided with adequate clearances to meet all possible maintenance activities.

#### 3.9.3.2 Right-of-Way Management

The proposed transmission lines will be built on COB property. No additional off-site right-of-way (easement or in fee) will be required for the electrical interconnection portion of the MPP. As such, the COB will have continuous control of the transmission line route.

#### 3.9.3.3 Emergency/Safety Repairs

In the event of a cable failure, the COB will locate the fault and determine appropriate repairs. If the cable cannot be repaired, it will be removed from the conduit and be replaced. If the cable cannot be removed from the duct bank, a new cable will be installed in the spare conduit and the damaged cable will be abandoned in place. Control and protection equipment at the plant and within the switchyard will monitor and control the safe operation of the lines, and will automatically "trip" the plant (or a portion of it) in the event of a cable or termination failure. As the transmission lines will be located within plant service roads, and the termination structures will be confined to the new GSUS and the existing Olive Switchyard, the COB will have continuous access to all of the electrical interconnection facilities in the event of an emergency.

#### 3.9.3.4 Hardware Maintenance

As the proposed transmission lines will be placed underground, no insulator strands will be installed as part of the transmission line portion of the project, and therefore no insulator washing will be required. However, periodic cleaning of the transmission line terminators and switchyard insulators and bushings may be required to remove contamination. Such cleaning will be performed based on visual inspections scheduled by COB plant and switchyard operating personnel.

### 3.9.4 Pipelines

The COB will own, operate, and maintain the water supply pipelines and associated facilities in accordance with applicable regulations and their normal operating procedures. There will be connections to the existing city water system for potable water and fire water. Reclaimed water from the existing onsite system will be used as cooling tower makeup.

Operation and maintenance of the natural gas pipeline from the existing fuel gas supply lines adjacent to the site metering and regulator equipment will be performed by SoCalGas in accordance with applicable Federal Energy Regulatory Commission (FERC) and U.S. Department of Transportation (DOT) regulations. This piping system will receive periodic inspections as part of SoCalGas' pipeline maintenance program.

Industrial wastewater will be discharged to the existing onsite sanitary sewer system. The connection to the system will be built, owned, and operated by the COB.

## 3.10 DECOMMISSIONING

Facility closure can be either temporary or permanent. Facility closure can result from two circumstances: 1) the facility is closed suddenly and/or unexpectedly due to unplanned circumstances, such as a natural disaster or other unexpected event (e.g., a temporary shortage of facility fuel); or 2) the facility is closed in a planned, orderly manner, such as at the end of its useful economic or mechanical life or due to gradual obsolescence. The two types of closure are discussed in the following sections.

### 3.10.1 Temporary Closure

Temporary or unplanned closure can result from a number of unforeseen circumstances, ranging from natural disaster to economic forces. For a short term unplanned closure, where there is no facility damage resulting in a hazardous substance release, the facility would be kept “as is”, ready to re-start operating when the unplanned closure event is rectified or ceases to restrict operations.

In the event that there is a possibility of a hazardous substances release, the Applicant will notify the CEC compliance unit and follow emergency plans that are appropriate to the emergency response management plan. Depending upon the expected duration of the shutdown, chemicals may be drained from the storage tanks and other equipment. All wastes (hazardous and non-hazardous) will be disposed of according to LORS in effect at the time of the closure. Facility security will be retained so that the facility is secure from trespassers.

### 3.10.2 Permanent Closure

The planned life of the generation facility is 25 years. However, if the facility were economically viable at the end of the 25-year operating period, it could continue to operate for a much longer period of time. As power plant operators continuously upgrade their generation equipment, and maintain the equipment up to industry standards, there is every expectation that the generation facility will have value beyond its planned life.

## 3.11 ALTERNATIVES

### 3.11.1 Site Selection Analysis

For a large power plant intended to serve the customers of the Participating Members of the SCPPA, many interests must be balanced when selecting a generating plant site, such as the availability of fuel and water supplies; diversity of generation resources and transmission routes to provide reliable electric power supply; and compatibility with landowner and local citizen interests. The COB offered its existing generating plant site that meets all of the criteria listed for this project.

### 3.11.2 Alternative Site Layouts

The COB property has been fully developed as a generating facility as well as providing a centralized general maintenance and administration location for their operations. The two oldest units installed on the site, Magnolia Units 1 and 2 had been decommissioned and installing the project at that location will be the least disruptive to the other operations of the COB.

The selection of the site layout is based on consideration of the following issues and criteria:

- Physical space requirements and relationships dictated by the major plant systems
- Physical size and shape of the existing site
- Existing topography of the site
- Clearance requirements between equipment, buildings, and structures for construction, operations, maintenance, and fire protection
- Conformance with all applicable laws, regulations, and environmental standards.

Design, operation, and maintenance criteria dictate that a reasonably flat area be provided for the major plant equipment, buildings, and structures. The existing site topography for the proposed power block area is relatively flat so no major cuts or fills are required.

The most compact and economical arrangement of the CTG, HRSG, and stack train is a linear arrangement. Because of the size and shape of the existing site, an east-west orientation of the CTG/HRSG train as well as the STG has been chosen. The STG will be parallel to the CTG/HRSG train as shown on Figure 3.4-2. With this arrangement, the main and auxiliary transformers can be located directly to the west.

### 3.11.3 Alternative Technologies and Equipment

#### 3.11.3.1 Alternative Fuels

Renewable energy technologies were judged to be inappropriate for several reasons. No geothermal or hydroelectric resources exist in western Los Angeles County. Biomass fuels (such as wood waste) are not locally available in sufficient quantities to make them a reasonable alternative fuel. Solar and wind technologies were rejected because they are only dispatched when the weather conditions are suitable and require much more land mass for the same amount of output.

Other than renewable energy sources, coal or oil could potentially serve the needs of the facility. They were rejected because of the impact on ambient air quality relative to natural gas.

The availability of natural gas as a fuel source in the area, as well as the environmental and economic advantages of natural gas when compared to available alternative fuels, make it the logical fuel for the proposed project.

#### 3.11.3.2 Alternative Turbine Technologies

Two turbine manufacturers are being considered for this project. These manufacturers are GE and Siemens/Westinghouse.

#### 3.11.3.3 Alternative Emission Control Technologies

One of the project objectives as stated in Section 2.0 of this AFC is to reduce facility air emissions to the maximum technologically feasible level. One reason to pursue this objective is to attempt to create a positive air quality impact in the Los Angeles basin. Given this desired level of performance, the Applicant selected dry low $NO_x$ combustion combined with post-combustion technology (SCR) that offers a very low emissions profile.

The Applicant rejected $SCONO_x$™ as a viable post-combustion technology for this project for several important reasons:

- $SCONO_x$™ is an unproven technology in this size application.

- $SCONO_x$™ would require substantial increased costs and complications associated with in-process regeneration.

## 3.11.4 Alternative Water Supply Sources

Potable water supplied by the COB will be used when necessary. Given the physical constraints on potable water supply in Southern California and the political nature of the issue, reclaimed water represents the best option for cooling tower makeup only if some of the discharge limits for reused reclaim water are relaxed, or mass limits, rather than concentration limits, are applied. The cooling tower makeup water can be supplied by the Reclaimed Water Plant and doing so provides a use for this water that would otherwise be discharged to the ocean.

### 3.11.4.1 Alternative Water Quality Discharge Limits

Water quality limits needed to allow higher cycles of concentration to be used in the cooling tower are shown in Table 3.11-1. A change from 1.5 cycles of concentration to 2 cycles of concentration allows a reduction in water use of 2,178,000 gallons per day at the cooling tower. A change from 1.5 cycles to 3 cycles of concentration allows a reduction of an additional 3,267,000 gallons per day. For the most part, the COB can supply the amounts of reclaimed water presented in Table 3.11-1. A water balance diagram illustrating the use of 3 cycles of concentration in the cooling tower is shown on Figure 3.4-5C.

**TABLE 3.11-1**

**CHANGES IN DISCHARGE AS A FUNCTION OF CYCLES OF CONCENTRATIONS**

| | Cycles of Concentration in the Cooling Tower | | | | |
|---|---|---|---|---|---|
| **Limiting Parameters** | **1.5** | **2** | **3** | **4** | **5** |
| Total Dissolved Solids, TDS, mg/l | 1,100 | 1,500 | 2,200 | 3,000 | 3,700 |
| Chloride | 190 | 190 | 270 | 350 | 450 |
| Sulfate | 300 | 300 | 325 | 425 | 450 |
| Boron | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 |
| 1,4-dichlorobenzene | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 |
| 1,2-dichloroethane | 0.005 | 0.005 | 0005 | 0.005 | 0.005 |
| bis(2-ethylhexyl)phthalate | 0.1 | 0.15 | 0.2 | 0.25 | 0.3 |
| | | | | | |
| Makeup water used in Kgpd is assumed to be all Reclaim Water | 6,560 | 4,382 | 3,293 | 2,930 | 2,748 |

These changes are only possible if the limits are changed to allow the discharges shown in Table 3.11-1. Since the Burbank Water Reclamation Plan is actively pursuing changes that will lower the heavy metals content of the reclaim water, the heavy metals limits have been assumed to be at or below the 0.001 mg/l achievable by the iron co-precipitation process. The

Burbank Water Reclamation Plant is also pursuing the removal of nitrogen from a total nitrogen standpoint. The nitrogen limits are not addressed in this application.

Minor modifications will allow operation of the cooling tower at 3 cycles of concentration as shown on the diagram Figure 3.4-5C.

### 3.11.5 Transmission Alternatives

The proposed MPP will require the installation and operation of high voltage transmission lines to facilitate the electrical interconnection necessary to the move the power from the new CTG and STG to the COB substation which is connected to the LADWP transmission grid and the participating SCPPA municipal utilities. The following alternatives were considered by the SCPPA in developing the planned electrical interconnection.

#### 3.11.5.1 Delivery Points

Interconnecting the new MPP CTG and STG to a SCPPA member utility substation or switchyard may well be a feasible interconnection option. However, such an interconnection from the new generation site could require one or more of the following:

- Significant upgrades to existing transmission lines and substations in the SCPPA service territory

- Development of a new transmission line or lines between the MPP complex and the off-site termination point.

New off-site transmission lines would generate environmental and economic impacts associated with the construction and operation of new overhead or underground transmission lines through a heavily developed landscape. Establishing the delivery point at the existing COB Olive 69 kV Switchyard and utilizing existing COB 69 kV transmission lines will eliminate the potential for such impacts to the surrounding environment, and will minimize overall interconnection costs.

#### 3.11.5.2 Transmission Voltage

Various transmission voltages could be used to transmit the proposed 250 MW of new generation from the MPP. However, selecting a voltage other than 69 kV would require the construction of new or expanded substation facilities, the addition of transformers, and construction of new transmission lines. As 69 kV is the primary transmission voltage of the COB, it was determined that the electrical interconnection was most viable at 69 kV. Furthermore, building the interconnection at 69 kV will minimize, if not eliminate, environmental impacts associated with the construction and operation of new transmission lines and substations. It will also be the most economical method of connecting the new generation to the LADWP and the COB transmission grid.

### 3.11.5.3 Conductor Selection

Later engineering will determine the final conductor for the 69 kV transmission lines. However, assuming that 69 kV is the transmission voltage, and given the projected load of 250 MW, it is anticipated that the underground design will use EPR solid dielectric insulated cable, with at least 1,500 kcmil copper (or equivalent) conductor. If soil conditions are determined to be inadequate to meet ampacity calculations, a larger conductor may be an alternative. If a different transmission voltage is selected, a different conductor size would likely be required.

### 3.11.5.4 Number of Circuits

The number of circuits is determined by the transmission voltage and the load to be carried by the transmission line(s). The primary COB transmission voltage of 69 kV dictated the transmission voltage for the electrical interconnection for the MPP.

Initial engineering indicates that two circuits will be required to transmit 169 MW from the CTG and 147 MW from the STG to the Olive Switchyard.

### 3.11.5.5 Transmission Structures

As the proposed 69 kV transmission lines will be located entirely underground, no overhead structures will be required for the interconnection. Therefore, no alternative transmission structures were considered. The required termination structures will be designed to achieve maximum functionality at minimum cost. It is expected that at least two manholes will be required as part of the underground transmission line installation. They could be cast-in-place concrete structures, or, more likely, preformed concrete manholes delivered to the site in two or three sections.

### 3.11.5.6 Alternative Routes

Given the congestion within the MPP complex site, the COB selected the preliminary route for the underground transmission lines between the proposed GSUS and their existing Olive 69 kV Switchyard. The route location was established through existing and planned generation facilities and associated equipment (aboveground and underground) within the power complex. While slight modifications to the transmission line route will likely occur as the project proceeds through the engineering phases, it is expected that the route depicted on Figure 3.4-2 will be the general location for the proposed underground transmission lines.

Alternative routes were not identified because existing or planned facilities within the site would result in potential obstructions to the proposed underground duct bank construction or the alternative routes would interfere with existing or planned generation facilities and associated equipment.

#### 3.11.5.7 Route Variations

Variations to the final route of the transmission line may occur as a result of the following:

- Surveying
- Soil boring information
- Ampacity calculations
- COB plans for demolition and removal of abandoned generation equipment and installation of new generation facilities
- Final engineering relative to cable type, size, number per phase, and turning radius requirements and manhole locations.

However, the final transmission line route will not be located outside of the MPP complex. While slight variations to the planned route may occur, it will remain entirely on COB property.

### 3.11.6 Alternative Wastewater Discharge Methods

Blowdown from the cooling tower and other wastewaters will be discharged from the site. Industrial wastewater discharge is to the Burbank Western Wash Discharge 001 permitted by NPDES Permit CA0055531. Sanitary wastes must be sent to the sanitary waste line already onsite.

Treating the cooling tower blowdown is an alternative, costly treatment method for reducing the water use for the MPP. The solids would be removed from the blowdown and the relatively pure wastewater would then be returned to the tower basin as makeup. The actual water use would decrease because of the increased cycles of concentration and about 25 percent of the total makeup would be recycled back to the tower.

Alternate wastewater discharge methods include:

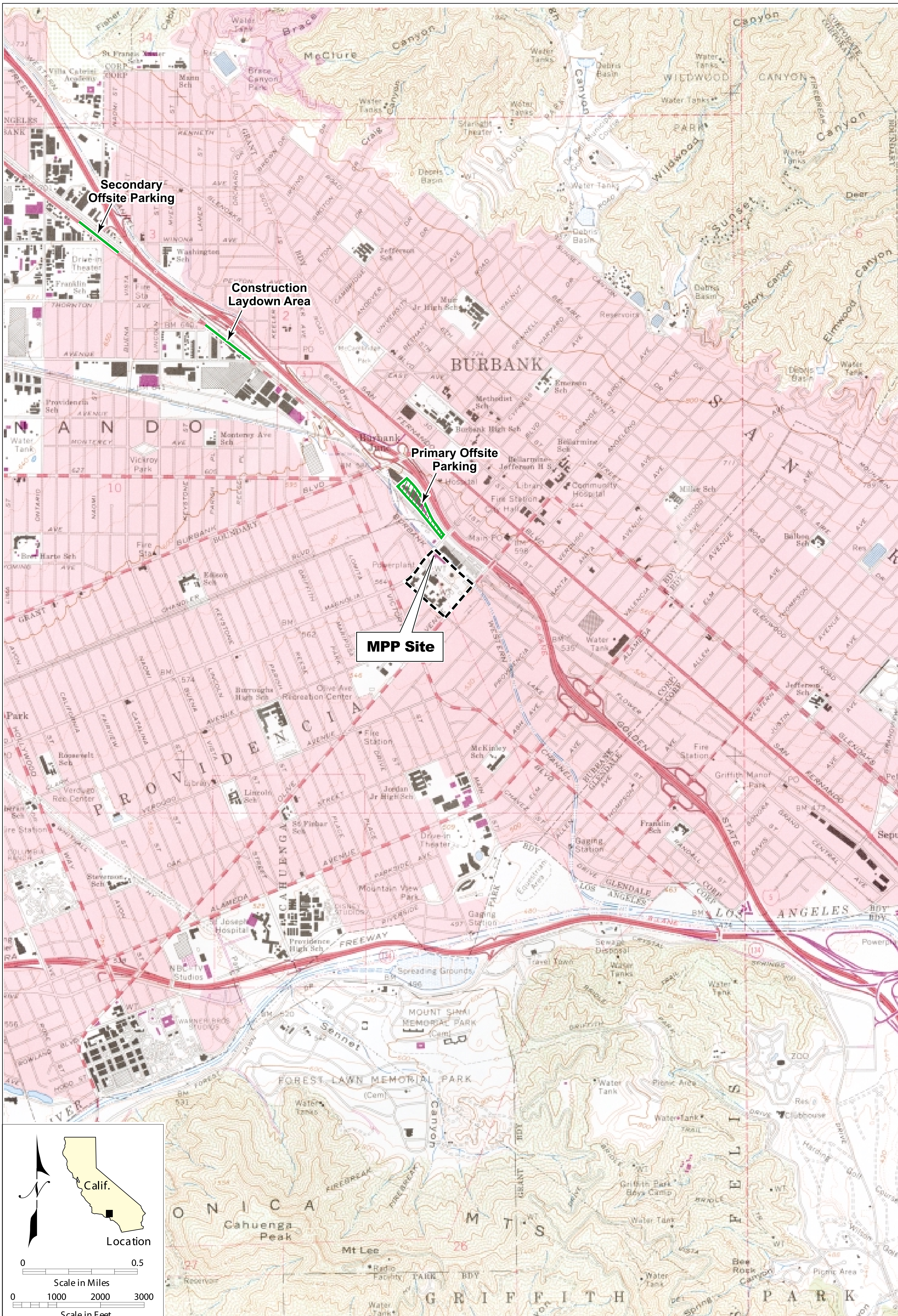
- Simple disposal to the LA County Hyperion Wastewater Treatment Plant instead of discharge to the Burbank Western Wash

- Evaporation of the wastewater with subsequent landfill of the solids

- Ion exchange concentration of the solids with either discharge to the Hyperion plant or evaporation with landfill disposal of the solids.

### 3.11.7 No Project Alternative

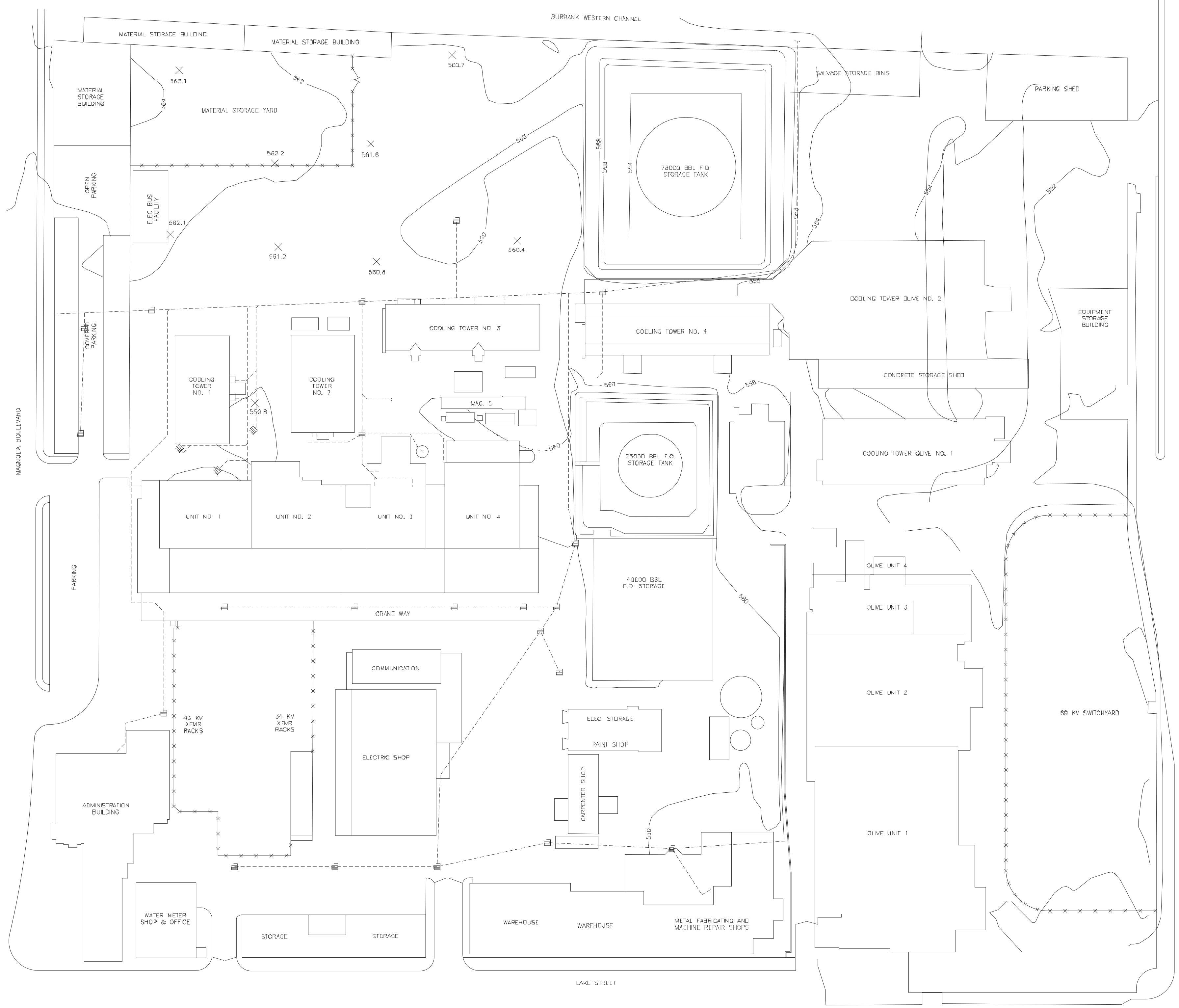
If the no project alternative were selected, it could result in increased environmental impacts for the region. Increased demand for electricity on existing local power plants would be placed on older, less efficient power facilities, or other power plants would have to be developed. Increased demand on the existing power plant could result in increased air emissions, natural gas usage, and less reliable electric service to the customers of the Participating Members of the SCPPA.

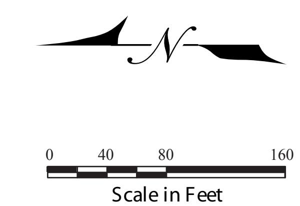



| Magnolia Power Project | **Source:** *Base Map from U.S.G.S. 7.5 Minute Topographic:* Burbank, CA 1966 (Photorevised 1972)(Minor Revision 1994) | **Figure 3.2-1.** SITE LOCATION MAP | March 2001 |
|---|---|---|---|

S:\00PROJ\00000084 BurbankMagnolia\201-034

S:\00PROJ\00000084 Burbank\Magnolia\201-064




## LEGEND

| | |
|---|---|
| ▭ ○ | EXISTING FACILITY |
| —560— | EXISTING CONTOUR |
| —x—x— | EXISTING FENCE |
| - - - - - | EXISTING DRAIN LINE |
| ▤ | EXISITNG CATCH BASIN |
| × 560.0 | SPOT ELEVATION |

## NOTES

1. THE GRID SYSTEM IS BURBANK WATER AND POWER YARD DATUM. YARD DATUM COORDINATE N 0.00, E 0.00 CORRESPONDS TO N 1885865.5435, E 6466295.8602 CALIFORNIA STATE PLANE, ZONE 5, NAD 83
2. BACKGROUND AND GRID SCANNED FROM DRAWING EM-271-K, GENERAL PLANT BUILDINGS & GROUNDS LAYOUT THE BACKGROUND CONTOURS SCANNED FROM DRAWING SHEET 1607, ANALYTICAL SURVEYS, INC., 1985. ALL COORDINATES AND DISTANCES SHALL BE FIELD VERIFIED.
3. SEE DWG S1000 FOR SITE ARRANGEMENT.
4. SEE DWG S3002 FOR PROPOSED GRADING AND DRAINAGE

| Magnolia Power Project | **Source:** Adapted from Black & Veatch Corp. Project 099523-DS-S3001 ( 1/11/01) | **Figure 3.3-1.** SITE-EXISTING TOPO PLAN | March 2001 |
|---|---|---|---|

S:\Ladd\Burbank\Magnolia\201-065

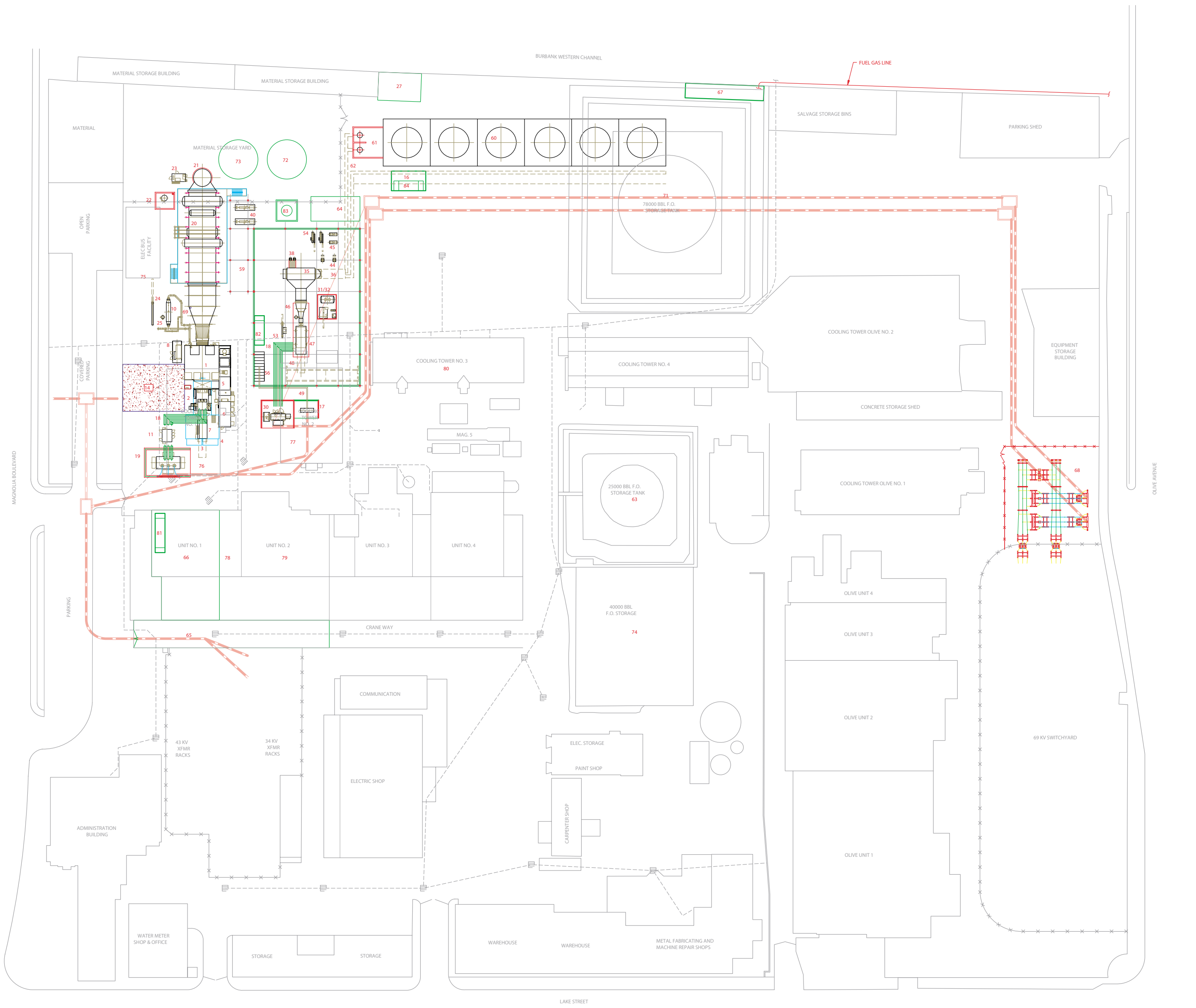

LEGEND

| | | | |
|---|---|---|---|
| | EXISTING FACILITY | | NEW FACILITY |
| 560 | EXISTING CONTOUR | | NEW CONCRETE |
| | EXISTING FENCE | | NEW FENCE |
| | EXISTING DRAIN LINE | | NEW DRAIN LINE |
| | EXISITNG CATCH BASIN | CB-1 | NEW CATCH BASIN |
| 560.0 | EXISTING SPOT ELEVATION | MH-1 | NEW MANHOLE |
| | EXISTING DRAIN LINE TO BE ABANDONED PER MANUFACTURER'S STANDARDS | 560.0 | NEW SPOT ELEVATION |
| | | | FLOW INDICATOR |
| | | | SILT FENCE AROUND CATCH BASINS (10 PLCS) |

NOT TO BE USED FOR CONSTRUCTION

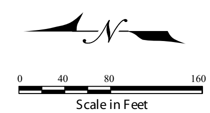
| | | | |
|---|---|---|---|
| **Magnolia Power Project** | **Source:** Adapted from Black & Veatch Corp. Project 099523-1STF-S3002 (1/10/01) | **Figure 3.4-1.** SITE-GRADING AND DRAINAGE PLAN | March 2001 |

S:\00PROJ\00000084 Burbank\Magnolia\201-063A




FACILITY LEGEND

| ID | FACILITY | FOUNDATION | TIEDOWN LOCATION | | REMARKS |
|---|---|---|---|---|---|
| | | | NORTH | EAST | |
| 1 | COMBUSTION TURBINE | | | | |
| 2 | COMBUSTION TURBINE GENERATOR | | | | |
| 3 | C T GENERATOR ROTOR REMOVAL | | | | |
| 4 | COMBUSTION TURBINE INLET AIR FILTER | | | | |
| 5 | C T MECHANICAL PACKAGE | | | | |
| 6 | C T ELECTRICAL PACKAGE | | | | |
| 7 | C T STARTER PACKAGE | | | | |
| 8 | COMBUSTION TURBINE CO2 FIRE PROTECTION SKID | | | | |
| 10 | C T ROTOR COOLER | | | | |
| 11 | C T GENERATOR EXCITATION/PT COMPARTMENT | | | | |
| 14 | COMBUSTION TURBINE MAINTENANCE AREA | | | | |
| 16 | COOLING TOWER ELECTRICAL BUILDING | | | | |
| 17 | AUXILIARY TRANSFORMER | | | | |
| 18 | ISOLATED PHASE BUS DUCT | | | | |
| 19 | C T GENERATOR STEPUP TRANSFORMER | | | | |
| 20 | HEAT RECOVER STEAM GENERATOR | | | | |
| 21 | HEAT RECOVERY STEAM GENERATOR EXHAUST STACK | | | | |
| 22 | HRSG BLOWDOWN TANK | | | | |
| 23 | CONTINUOUS EMMISSION MONITOR EQUIPMENT | | | | |
| 24 | FUEL GAS HEATER | | | | |
| 25 | FUEL GAS SCRUBBER | | | | |
| 27 | FUEL GAS COMPRESSOR BUILDING | | | | |
| 30 | STEAM TURBINE GENERATOR STEPUP TRANSFORMER | | | | |
| 31 | STEAM TURBINE LUBE OIL PACKAGE | | | | |
| 32 | STEAM TURBINE E H C UNIT | | | | |
| 35 | CONDENSER | | | | |
| 36 | CONDENSER TUBE REMOVAL | | | | |
| 38 | CONDENSATE PUMP | | | | |
| 40 | BOILER FEED PUMP | | | | |
| 44 | CLOSED CYCLE COOLING WATER HEAT EXCHANGER | | | | |
| 45 | CLOSED CYCLE COOLING WATER PUMP | | | | |
| 46 | STEAM TURBINE | | | | |
| 47 | STEAM TURBINE GENERATOR | | | | |
| 48 | STEAM TURBINE ROTOR REMOVAL | | | | |
| 49 | NON-SEG BUS DUCT | | | | |
| 53 | GLAND STEAM CONDENSER | | | | |
| 54 | CONDENSER EXHAUSTER | | | | |
| 56 | CT & ST 4.16KV SWITCHGEAR | | | | |
| 59 | PIPE SUPPORT RACK | | | | |
| 60 | COOLING TOWER | | | | |
| 61 | CIRCULATING WATER PUMPS | | | | |
| 62 | CIRCULATING WATER PIPE | | | | |
| 63 | 25000 BBL FUEL OIL STORAGE TANK & BERMS | | | | TO BE REMOVED |
| 64 | DEMIN TRUCK LOCATION | | | | |
| 65 | FUTURE PARKING | | | | |
| 66 | NEW ADMIN BUILDING EXPANSION | | | | |
| 67 | FUEL GAS REGULATOR STATION | | | | |
| 68 | SWITCHYARD EXTENSION | | | | |
| 69 | HRSG DUCT BURNERS | | | | |
| 70 | STG BRIDGE CRANE | | | | |
| 71 | 78000 BBL FUEL OIL STORAGE TANK & BERMS | | | | TO BE REMOVED |
| 72 | DEMIN WATER TANK | | | | |
| 73 | CONDENSATE STORAGE TANK | | | | |
| 74 | 40000 BBL FUEL OIL STORAGE | | | | TO BE REMOVED |
| 75 | ELECTRIC BUS FACILITY | | | | TO BE REMOVED |
| 76 | MAGNOLIA COOLING TOWER NO. 1 | | | | TO BE REMOVED |
| 77 | MAGNOLIA COOLING TOWER NO. 2 | | | | TO BE REMOVED |
| 78 | MAGNOLIA UNIT NO. 1 | | | | TO BE REMOVED |
| 79 | MAGNOLIA UNIT NO. 2 | | | | TO BE REMOVED |
| 80 | MAGNOLIA COOLING TOWER NO. 3 | | | | TO BE REMOVED |
| 81 | ADMINISTRATION BUILDING 480V SUS | | | | |
| 82 | BALANCE OF PLANT 480V SUS | | | | |
| 83 | AMMONIA STORAGE TANK WITH SUN SHIELD | | | | |
| 84 | COOLING TOWER 480V SUS | | | | |

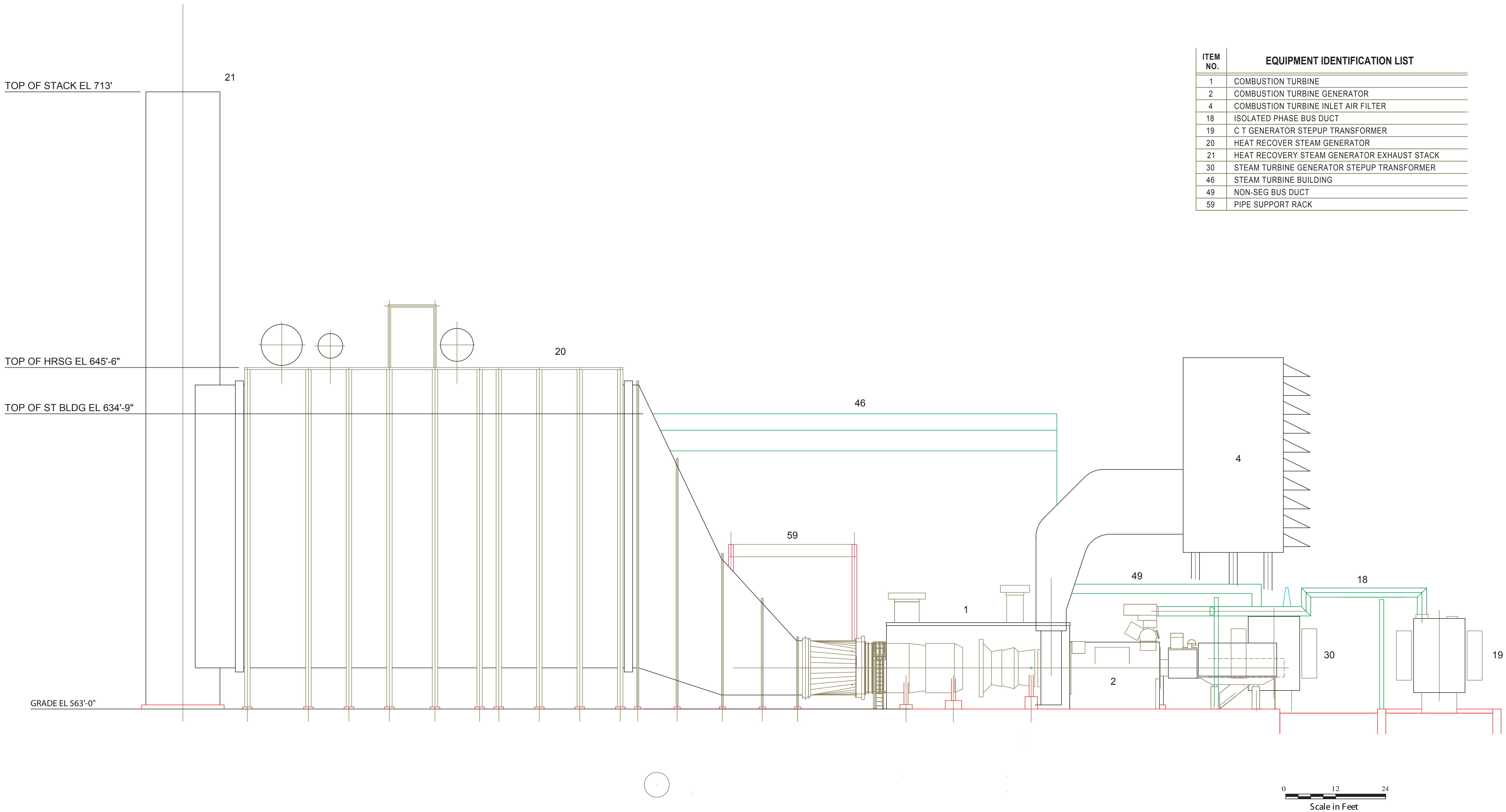



GENERAL LEGEND

- CONCRETE
- NEW FACILITY
- EXISTING FACILITY
- NEW FENCE
- EXISTING FENCE
- TRANSMISSION LINE DUCT BANK

| **Magnolia Power Project** | **Source:** Adapted from Black & Veatch Corp. Project 099523-DS-S1000 ( 1/10/01) | **Figure 3.4-2.** SITE ARRANGEMENT PLAN | March 2001 |
|---|---|---|---|

S:\Ladd\Burbank\Magnolia\301-079




| ITEM NO. | EQUIPMENT IDENTIFICATION LIST |
|---|---|
| 1 | COMBUSTION TURBINE |
| 2 | COMBUSTION TURBINE GENERATOR |
| 4 | COMBUSTION TURBINE INLET AIR FILTER |
| 18 | ISOLATED PHASE BUS DUCT |
| 19 | C T GENERATOR STEPUP TRANSFORMER |
| 20 | HEAT RECOVER STEAM GENERATOR |
| 21 | HEAT RECOVERY STEAM GENERATOR EXHAUST STACK |
| 30 | STEAM TURBINE GENERATOR STEPUP TRANSFORMER |
| 46 | STEAM TURBINE BUILDING |
| 49 | NON-SEG BUS DUCT |
| 59 | PIPE SUPPORT RACK |

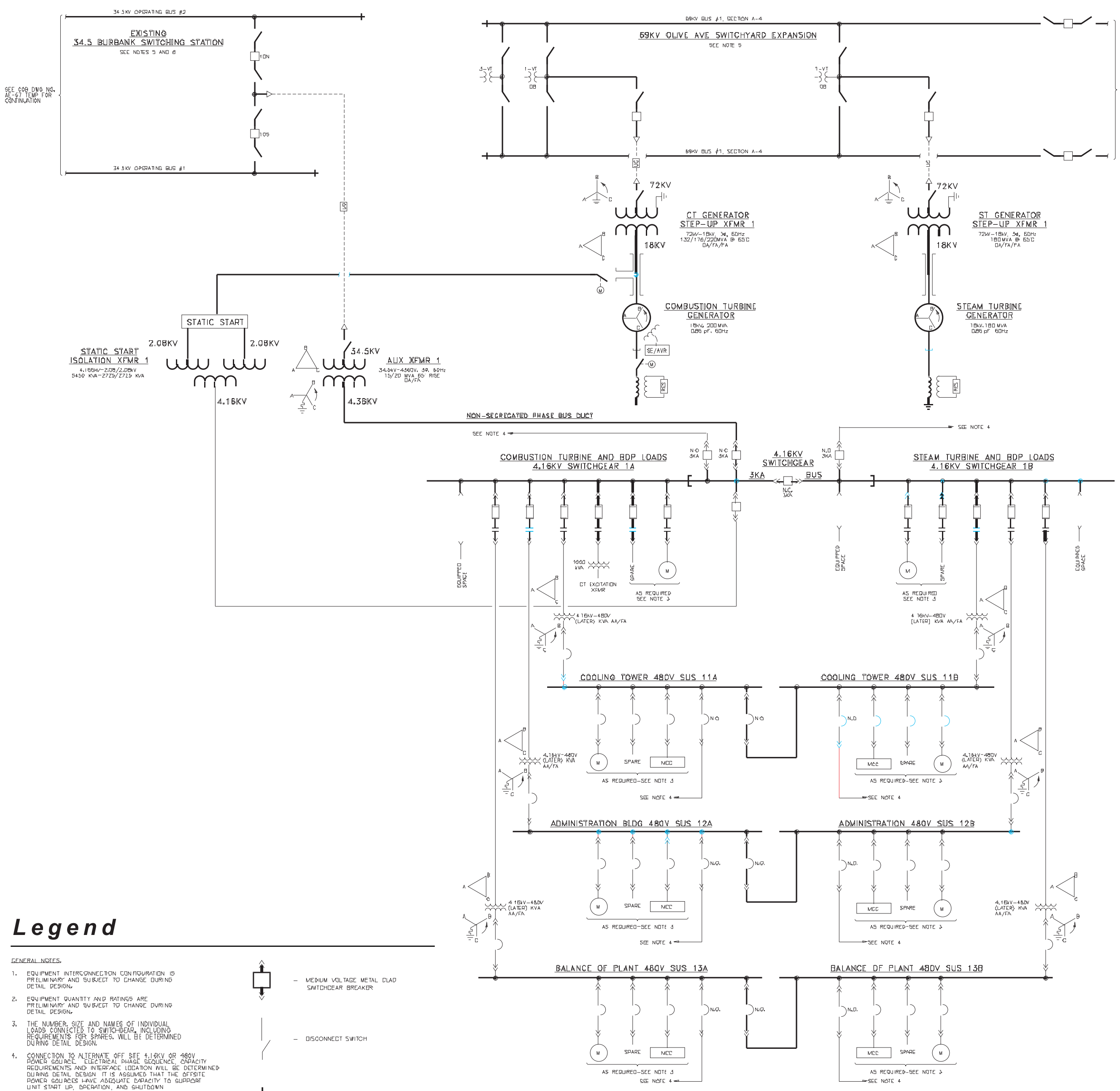
**Magnolia Power Project**

**Source:** Black and Veatch Corporation

**Figure 3.4-3.** SITE ELEVATION

March 2001

S:\Vadd\Burbank\Magnolia\201-066




## Legend

GENERAL NOTES.

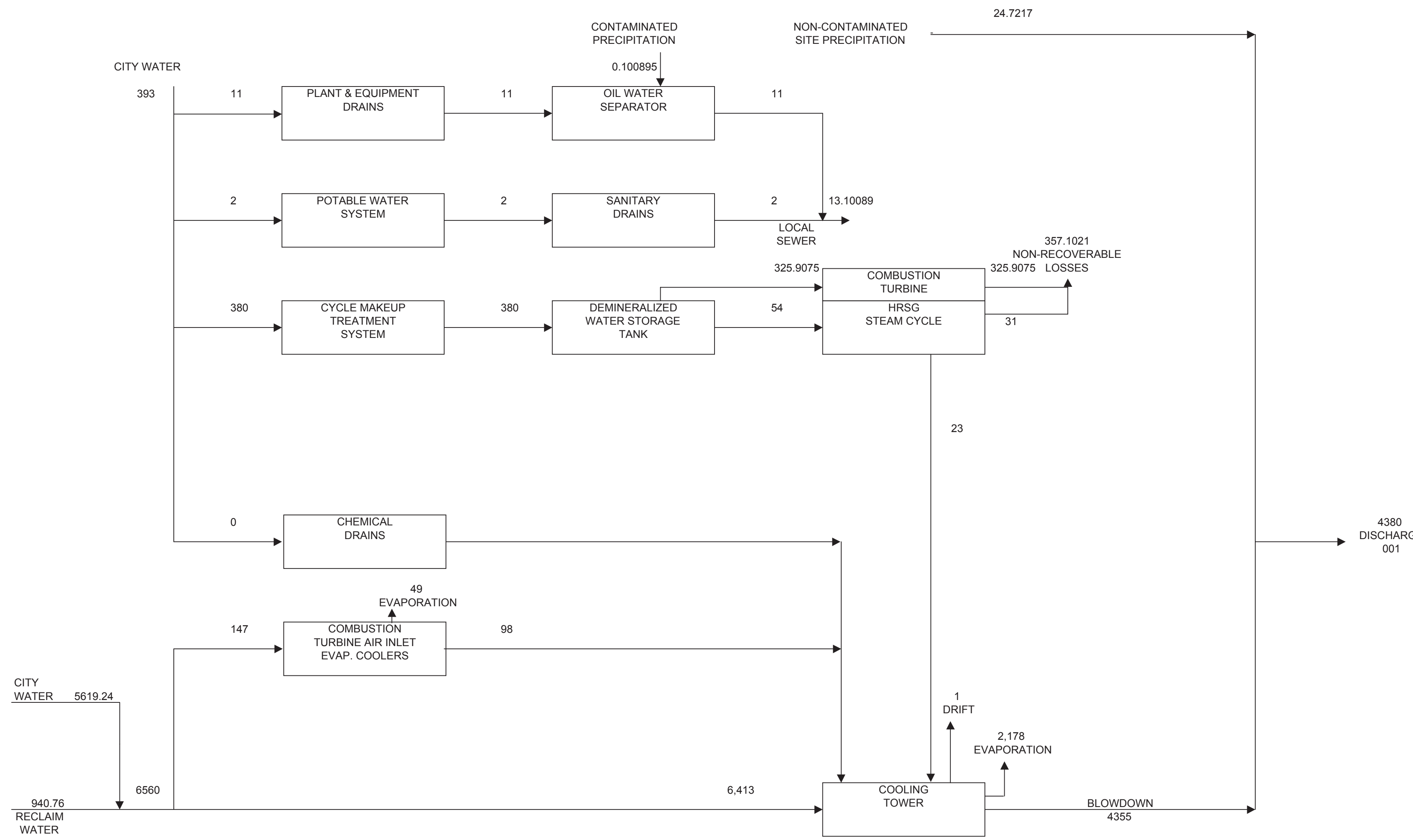
1. EQUIPMENT INTERCONNECTION CONFIGURATION IS PRELIMINARY AND SUBJECT TO CHANGE DURING DETAIL DESIGN.
2. EQUIPMENT QUANTITY AND RATINGS ARE PRELIMINARY AND SUBJECT TO CHANGE DURING DETAIL DESIGN.
3. THE NUMBER, SIZE AND NAMES OF INDIVIDUAL LOADS CONNECTED TO SWITCHGEAR, INCLUDING REQUIREMENTS FOR SPARES, WILL BE DETERMINED DURING DETAIL DESIGN.
4. CONNECTION TO ALTERNATE OFF SITE 4.16KV OR 480V POWER SOURCE. ELECTRICAL PHASE SEQUENCE, CAPACITY REQUIREMENTS AND INTERFACE LOCATION WILL BE DETERMINED DURING DETAIL DESIGN. IT IS ASSUMED THAT THE OFFSITE POWER SOURCES HAVE ADEQUATE CAPACITY TO SUPPORT UNIT START UP, OPERATION, AND SHUTDOWN.
5. 69KV AND 34.5KV SUBSTATION PHASING SEQUENCE AND PEAKING ORDER WILL BE DETERMINED DURING DETAIL DESIGN.
6. IT IS ASSUMED THAT THE 34.5KV SUBSTATION HAS ADEQUATE CAPACITY TO SUPPORT STARTING AND OPERATION OF THE POWER GENERATION AND AUXIUARY SUPPORT EQUIPMENT AS SHOWN ON THIS DRAWING.

LEGEND

- M – MEDIUM OR LOW VOLTAGE MOTOR
- SE/AVR – STATIC EXCITER AND AUTOMATIC VOLTAGE REGULATOR
- — UG — – UNDERGROUND CABLE CONNECTION
- – ISOLATED PHASE BUS DUCT
- – MEDIUM VOLTAGE MOTOR STARTER ASSEMBLY
- – MEDIUM VOLTAGE METAL CLAD SWITCHGEAR BREAKER
- – DISCONNECT SWITCH
- – MOTOR OPERATED DISCONNECT SWITCH
- – LOW VOLTAGE METAL ENCLOSED SWITCHGEAR BREAKER
- – EQUIPPED SPACE FOR FUTURE ADDITION OF CIRCUIT BREAKER OR MOTOR STARTER
- MCC – 480 VOLT MOTOR CONTROL CENTER
- N.O. – NORMALLY OPEN
- N.C. – NORMALLY CLOSED
- RES – RESISTOR
- SUS – 480 VOLT LOW VOLTAGE SECONDARY UNIT SUBSTATION
- BOP – BALANCE OF PLANT
- – GROUNDING RESISTOR
- – METAL CLAD SWITCHGEAR AND BREAKER

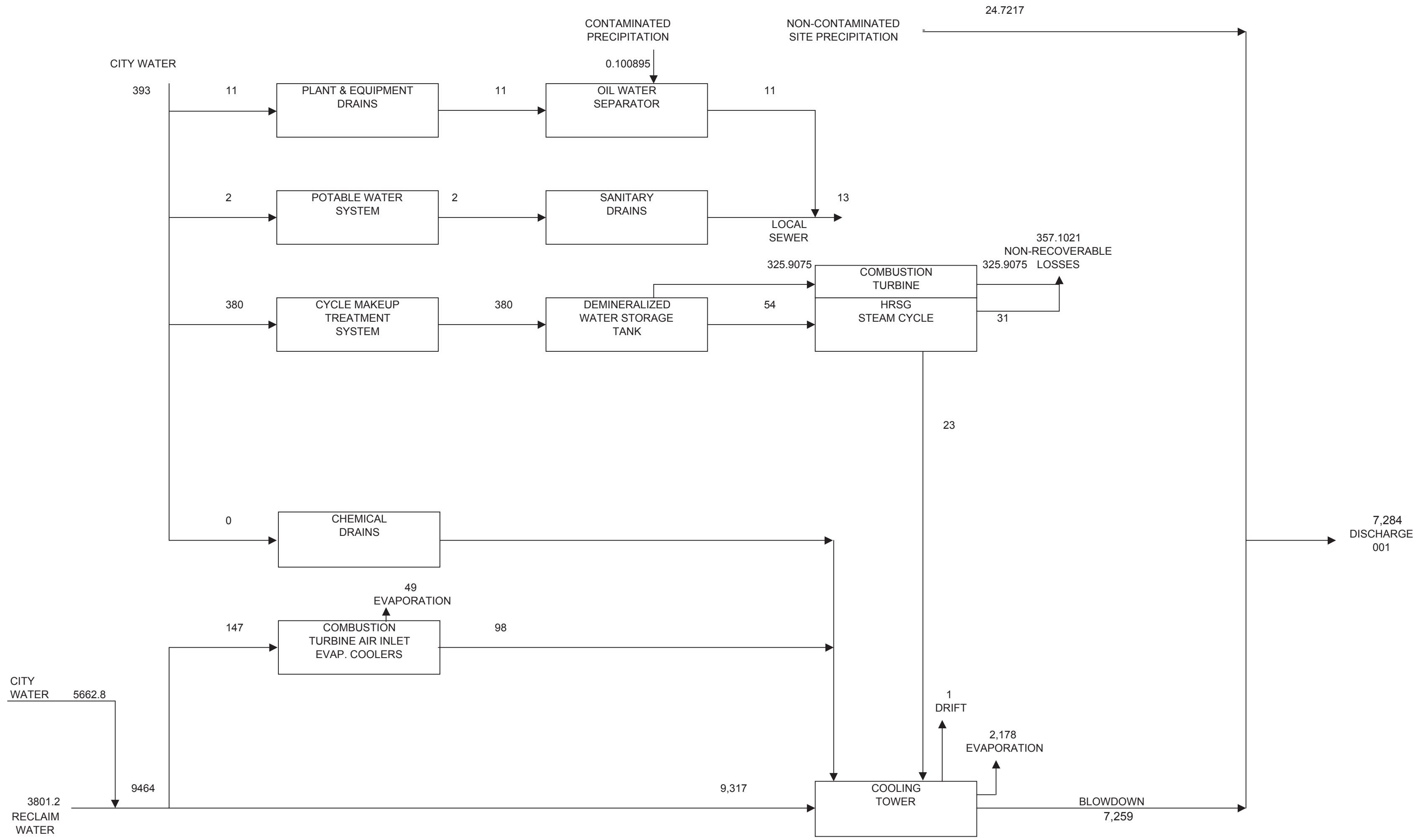
| Magnolia Power Project | Figure 3.4-4. ELECTRICAL DIAGRAM | March 2001 |
|---|---|---|

S:\Ladd\Burbank\Magnolia\301-080




| **Magnolia Power Project** | **Source:** Black & Veatch Corp. | **Figure 3.4-5A.** WATER BALANCE (AVERAGE) | March 2001 |
|---|---|---|---|

S\Ladd\BurbankMagnolia\301-081

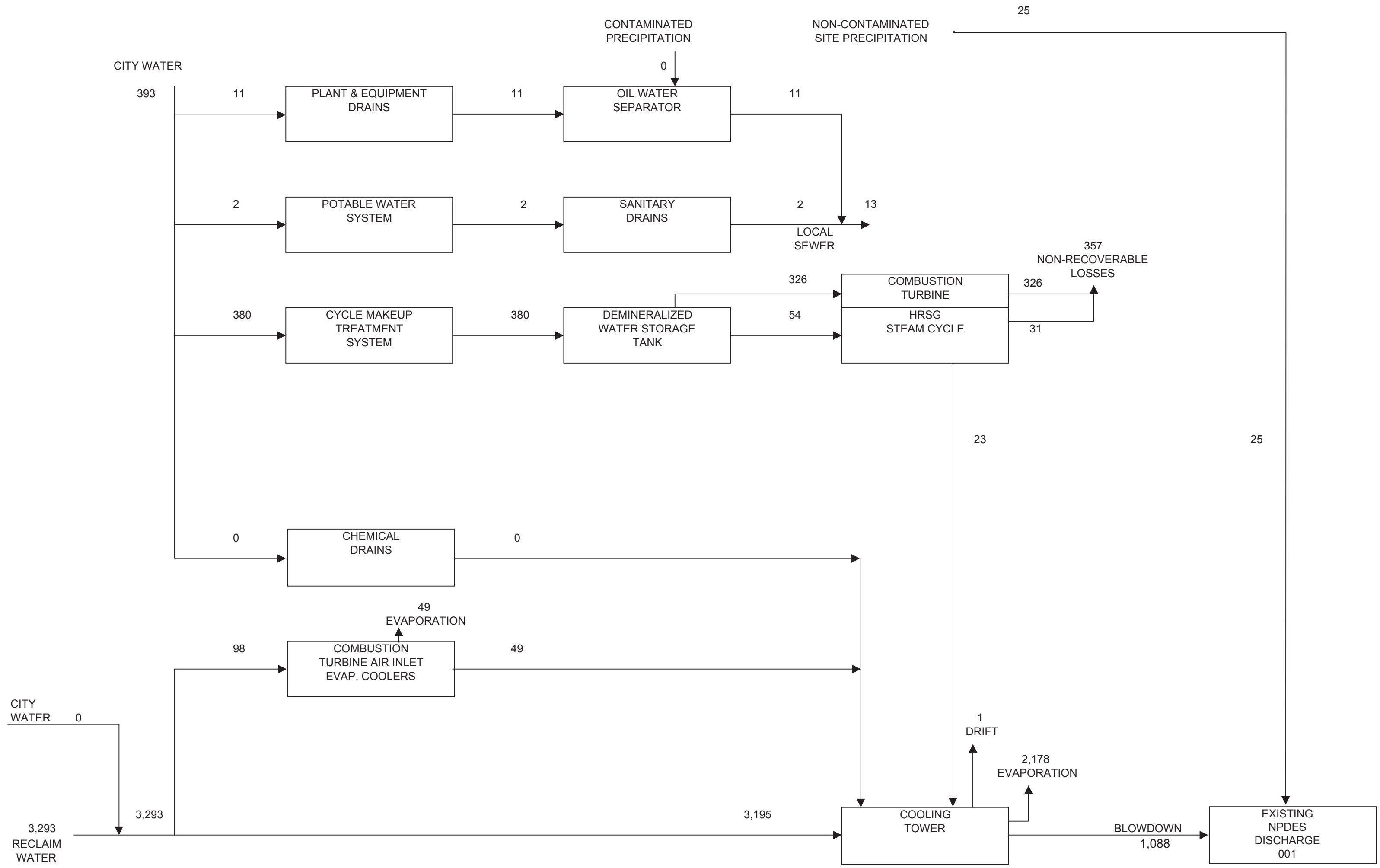



**Magnolia Power Project**

**Source:**
Black & Veatch Corp.

**Figure 3.4-5B.** WATER BALANCE (MAXIMUM)

March
2001




S\Ladd\BurbankMagnolia\401-152

**Magnolia Power Project**

**Source:**
Black & Veatch Corp.

**Figure 3.4-5C.** MAXIMUM RECLAIM WATER USE WITH MODIFIED DISCHARGE LIMITS

March 2001